Adolescent Development of the Self:

Long-term Risks and Life Outcomes

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The only journey is the journey within.

Rainer Maria Rilke

1 INTRODUCTION

Adolescence - the developmental period between childhood and adulthood is marked by a number of profound changes and challenges in different areas of life, such as in the physical, social and psychological domain (Donnellan, Trzesniewski, & Robins, 2006; Eccles, 1993). A century ago, these remarkable changes led to a description of adolescence as a time of "storm and stress" (Hall, 1904) with inherent difficulties for the developing individual. This notion is no longer adequate because most adolescents manage age-specific challenges well without developing any major problems (Steinberg, 1999). The manifold changes that accompany adolescence, however, are still assumed to bare an increased potential/risk for the onset of long-term (mal-)adaption – resulting in positive or negative developmental spirals (Eccles, 1993, Blakemore & Mills, 2013). According to Erikson's identity formation theory each life stage poses distinctive challenges that are consequential for later periods in life. The altering circumstances that confront the developing adolescent may result in a sense of inner entity or disorientation: Building up an identity during adolescence is considered as a prerequisite for meeting adult life challenges (Erikson, 1968; Erikson, 1973). That is, successful functioning in adulthood may only be accomplished if earlier developmental challenges are managed well (Zahn-Waxler, 1996). Based on these theoretical implications, the core of the present thesis aims at elucidating the relevance of developing self- and other-related competencies in adolescence for life span development. In other words, interests lie (a) in the description of developmental processes in adolescence and (b) in the informative value of different developmental patterns for long-term life outcomes: Do the developmental processes observed in adolescents possess any explanatory power for the adult life? Taking this perspective further, the second central research aim of the present thesis is to shed further light on the consequences

of adolescence *not only for oneself but also for related individuals*. Are more or less successful patterns observed in adolescence transmitted to the next generation of adolescents?

Even though researchers may differ in their opinions what 'successful' means, all of them might agree on the fact that it is adaptive for an individual to be in good mental health and to be socially well integrated. In the present thesis, a closer look is therefore paid to aspects of the self that are relevant to adolescence and their distinctive role for (a) the individual's mental health and social outcomes *across the lifespan*, and (b) for life outcomes of *related individuals across generations*.

The introduction is organized in the following parts. First, an overview of the *characteristics and challenges of adolescence* as well as their theoretical implications for later life, the *importance of considering change in adolescence* and *intergenerational transmission* processes are presented. Based on the theoretical part, the second part presents the theoretical constructs examined in this PhD thesis. Furthermore, their relevance for the adolescent years are summarized. Third, methodological considerations for studying these research questions are presented. Finally, a short overview of the aspired research aims is presented.

1.1 CHARACTERISTICS AND CHALLENGES OF ADOLESCENCE

Although each age period is considered to be equally important for successful human functioning across the lifespan (Baltes, 1987), it is possible to identify certain distinct domains and specificities that serve as representations of development for each age period (see Wilkening, Freund & Martin, 2009). Adolescence is an age period most easily observed with the onset of puberty, connected with its bodily changes and sexual development. Peer group orientation and increasing independence from the familial environment, intensified self-

evaluations, newly developed ideals and group identity, entrance in or preparation for the labor force are among the less obvious but just as important developmental processes (Donnellan, Trzesniewski, & Robins, 2006; Eccles, 1999; Steinberg, 2008). Connected to most of these challenges are questions reflecting the individual's identity (Who am I?, What do I want to do in life?, What values do I have?, Who am I in the eyes of others? What group do I belong to? How do I like myself?). Such self-perceptions can be described as intra-psychic representations of the self that reflect the developing identity of individuals (Erikson, 1968; Hogan & Roberts, 2004; Roberts & Wood, 2006).[1] Successful adaptation to the adolescent changes and challenges (resulting in a developed identity as opposed to identity diffusion) is theorized as necessary for later adjustment in adulthood (Erikson, 1968; Harter, 2006). While coping with adolescent challenges, individuals deal with (aspired) ideals striking factual reality – an examination that can result in harmonization and self-worth or in self-degradation (Leahy, 1985; Rosenberg, 1965). On the other hand, several arguments suggest that the changing world of adolescents not only threatens but also offers opportunities for individual growth in various domains of the developing individual (Fend, 1994; Steinberg, 2008).

First, the adolescent years are accompanied by a number of physical changes such as growth spurts, weight gain and hormonal changes. Learning to accept natural bodily changes is a necessary condition of becoming a mature adult with a developed sexual identity. Serious eating disorders are among the most commonly known consequences if physical changes are

[1] In the present thesis I refer to 'subjective identity' which refers to the individual conscience towards oneself as opposed to the 'objective identity' constituted by one's societal roles and social positions (Beck, 1968). Identity in this sense is reflected in the congruence and coherence of a person that has accepted her-/himself (Erikson, 1968; Fend, 1994).

not positively incorporated into a newly built-up self-image (O'Dea & Abramson, 1999; Steinberg, 2008).

Second, adolescents are prompted to make important choices for their future career, invest in school work and take up responsibility for success and failure as a student. Although career choices, academic tests, assessments and exams may be experienced as stressful, they also pose opportunities for the growing-up individual to discover his/her strengths and weaknesses and to develop aims and a meaningful future (Fend, 1994; Steinberg & Morris, 2001; Steinberg, 2008).

Third, with regard to the social domain, adolescents have the possibility to build up new and independent friendship circles largely independent of familial supervision, engage in first romantic relationships, take up responsibilities in associations and clubs or serve as mentors for younger children in school, at home or in social unions (Fend, 1994; Steinberg & Morris, 2001).

Taken together, handling age-specific challenges might give adolescents a genuine trust in themselves – a resource that might be effectual for the whole lifespan and not only for adolescence itself. The idea suggests itself to ask to what degree individuals differ in their coping with age-specific challenges, how effective and sustainable successful 'challenge-management' is (or how persistently harmful it is to fail) and how and why individuals differ with regard to their developmental process throughout a time of profound change.

1.1.1 STUDYING ADOLESCENT DEVELOPMENT AS A PREDICTOR OF LIFE OUTCOMES

Theories on adolescence have in common that they all emphasize the significance of *change* during this age period. For example, Eccles (1999) stated "*few developmental periods are characterized by so many changes at so many different levels as early adolescence*" (p. 36;

see also Blakemore & Mills, 2013; Steinberg, 2005). During adolescence, the lightheartedness of childhood with relatively low levels of responsibility decreases and individuals move towards more autonomously functioning lifestyles. Normatively, adolescents grow in various life-long relevant competencies in the context of a relatively large number of transformations within and outside the individual (Grob & Jaschinski, 2003). The challenges and changes experienced by adolescents have the function to increase the independence from the parental protection, to generate sexual functioning and intimate bonding and to become socially responsible and financially autonomous adults (Zahn-Waxler, 2006). Indeed, adolescents are not only confronted with inner processes such as growth spurts, hormonal, cognitive and sexual developments but also with developmental processes that reflect the social world around them as they are often given increased (and expected to grow in) social and individual responsibilities (Donnellan, Trzesniewski, & Robins, 2006; Eccles, 1993; Petersen et al., 1993; Steinberg, 2001). Furthermore, research in brain development during adolescence has shown that the adolescent brain undergoes a considerable amount of reorganization, especially in the prefrontal cortex (Steinberg, 2005), a region that is associated with self-control and empathy. This finding even led to changes in law policies with the consequence of banning the juvenile death penalty in the USA (Steinberg, 2008). However, although commonly acknowledged and emphasized, most studies lack a developmental approach to studying the long-term consequences of the adolescent years.

Furthermore, because most adolescents show relatively unproblematic developmental processes throughout the somewhat roaring adolescent years (Fend, 1994; Petersen et al., 1993; Steinberg, 2001), we may underestimate the consequences for those adolescents who show declines in important resources. For example, using a large longitudinal data set from age 14 to 23, Birkeland et al. (2012) found that 87 percent of all adolescents reported high feelings of

self-worth across all five measurement occasions, 5.5 percent reported chronically low and 7.4 percent showed an U-shaped development of self-worth across the 9 years of the study. These results confirm today's notion on adolescence stating that it can no longer be considered as a time of inherent difficulties (Hall, 1904; see also Eccles, 1993) but the question arises what exactly drove the developmental process of the minority of adolescents whose feelings of self-worth was threatened. In other words, one interest for adolescence might lie in the normative developmental process that is true for the majority of this age group but another focus of interest might lie in the non-normative development of the minority of adolescents that are more strongly affected by the challenges that serve as potential risks for such non-adaptive development. In line with this argumentation, we might overlook the consequences if the inner and outer conflicts are *not* resolved (Petersen, et al., 1993). The next logical question is then to investigate, what *consequences* must be expected from those adolescents who do experience difficulties, or "storm and stress", without resolving it. It is likely, for example, that adolescents who decrease in relevant resources might develop a set of characteristics that persists across the lifespan and reveals consequences long after those resources were taxed (Birkeland, et al., 2010). The consideration of adolescence as a malleable time period in tandem with an insisting call for studying development processes within lifespan theory (Baltes, Staudinger, & Lindenberger, 2006) led to a focus of studying adolescent development and its long-term life outcomes in the present PhD thesis.

However, despite various theorists claiming the importance of developmental processes during adolescence for later life outcomes, very little research has been conducted on the consequences of adolescent *development*. Based on theoretical assumptions and due to the lack of empirical work in this field, the present PhD thesis is driven by research questions paying special attention to the developmental process, the long-term and intergenerational relevance

of the adolescent years. The focus lies on the examination of theoretical constructs that are distinctive and highly relevant to adolescence as they reflect central challenges confronting the developing adolescent:

- *How do individuals perceive their changing body across these challenging years? Do they feel competent with regard to their social or academic skills? Do adolescents follow a common trajectory or are there interindividual differences in their intraindividual development?*
- *What are the consequences of negative trajectories in relevant domains of the developing individual? Are the developmental processes relevant for later life, independent of their initial level?*
- *Do self-characteristics observed in adolescence remain consequential not only for the individual but also for one's children? Where do the roots of positive development lie? Can good relations with parents exert power on adolescent positive self-development?*

Taken together, because adolescence as a malleable time period is assumed to be particularly relevant for long-term psychological adjustment (Birkeland, Melkevik, Holsen, & Wold, 2012; Huang, 2010; Trzesniewski et al., 2006), it seems to be an ideal time to unfold patterns of development during this age period and their long-term consequences.

1.1.2 INTERGENERATIONAL TRANSMISSION OF ADOLESCENT CHARACTERISTICS

By describing developmental processes and their long-term consequences, researchers usually refer to *intra*individual consequences. That is, the underlying assumption is that a certain resource is relevant for the individual him-/herself. The present thesis takes this 'long-term perspective' further by including '*linked individuals*' (i.e. in the sense of related; e.g.

parent-child) as the target of interest. In this sense, the term *'long-term'* might be interpreted *over and above the individual*, possibly showing an effect even for the next generation. That is, to better understand the relevance of adolescence in a long-term perspective, the next generation of adolescents was included in the investigation: By taking a perspective of *"looking ahead"*, it then becomes possible to examine whether certain characteristics of the self are related across generations or, by taking a perspective of *"looking back"*, this approach offers an interpretation about where certain characteristics of individuals are rooted in. A number of studies have revealed that certain attitudes, values or skills are transmitted to the next generation such as constructive parenting, (Chen & Kaplan, 2001), health-risk behaviors (Wickrama, Conger, Wallace, & Elder, 1999), achievement orientation (Baier & Hadjar, 2004), or perfectionism (Soenens, Elliot, Goossens, Vansteenkiste, Luyten, & Duriez 2003). Thus, the present thesis investigates not only the *intra*individual consequences of adolescent development but also whether adolescents *pass on specific characteristics to the next generation* across a time-span of three decades. In other words, it could be that Generation 2 adolescents show difficulties in their adolescent adaptation process if their parents, as adolescents, had such difficulties themselves. Similarities between generations may be due to the specific parenting style, a mutual influence between parent and child, or a third factor influencing both parent and child (e.g. genes) (Baier & Hadjar, 2004). A number of moderating variables such as parent-child relation, warmth or the time spent with children are assumed to play a role in the transmission of values, behaviour and attitudes (Hopf & Hopf, 1997; Rudy & Grusec, 2001; Schönpflug, 2001). The present thesis aims at contributing to a better understanding whether the characteristics and experiences acquired in adolescence exhibit informative value even for the next generation of adolescents. It is possible, for example, that a boy chronically low in self-esteem during adolescence not only suffers from his low self-esteem still as an adult, showing

insecurities and a higher degree of mal-adaptation in certain situations, but also has fewer competencies to function as an adequate role model (i.e. self-valuing, confidently acting adult) for his growing-up son. Investigating whether experiences made in adolescence remain consequential not only for the individual him-/herself but potentially for related individuals contributes to a better understanding of the adolescent age period and its long-term life outcomes.

1.1.3 PARENTING AND ADOLESCENT DEVELOPMENT

So far, an emphasis lay on the outlook of adolescent development. The next logical step is to look back and identify possible antecedents of positive adolescent development. Therefore, the last chapter of the thesis is concerned with a closer look at how the adolescent self develops and what might drive this development. Given the long-term implications of adolescent self-esteem, this study pays special attention to the evaluative attitude towards oneself, namely self-esteem. One of the most prominent framework (Mead, 1934) assumes that individuals' self-views are based on so-called reflected appraisals, that is, self-perceptions are built through the eyes of relevant others ("each to each a looking glass reflects the other that doth pass" Cooley, 1902). The underlying assumption is that genuine warmth towards, trust and belief in oneself through important others such as parents constitute and create own positive self-evaluations (e.g. Harter, 1999). Indeed, warm relationships with parents are consistently associated with better self-esteem across age, gender or countries in cross-sectional studies (Barber, Chadwick, & Oerter, 1992; Rice, 1990; Whitbeck, Simons, Conger, Lorenz, & Huck, 1991). Longitudinal studies, however, show inconsistent results and it is unclear whether parents exert a prospective effect on the adolescent self or whether the relationship between warm parenting and the adolescent self is already largely established in childhood. Due to the malleability and the

transitional character of adolescence with expected changes both in the self (Marsh, Craven, & Debus, 1991; Trzesniewski, Kinal, Donnellan, 2010) and in the relationship to parents (Bornstein, Jager, & Steinberg, 2012; Fraley & Davis, 1997), the interplay between the two constructs was examined from age 12 to 16. Such knowledge is particularly helpful to better understand what drives the dynamic of adolescent self-development.

Taken together, the present thesis is centered around the idea that the process of growing-up is as consequential as the starting conditions an individual holds. Therefore, one of the main aims of the thesis was to study *both* initial *level* and *change* of the self as predictors of life outcomes. Is the developmental process in relevant domains of adolescence consequential for the individual across the lifespan (Paper 1 and 2)? Based on the first interest, a further research interest lay in investigating not only the *intra*individual consequences of adolescence but the potential *inter*generational consequences of this age period (Study 3). Finally, to better understand the developmental dynamic in adolescence, the prospective influence of parents on adolescent self-development was examined (Study 4).

The present thesis uses global self-esteem, self-esteem of academic competence, physical appearance and empathy as indicators of how adolescents face and manage adolescent challenges. These constructs were chosen on the basis of their importance for the adolescent years. The next section of the introduction presents the investigated constructs of the present thesis and points out their relevance for the adolescent years.

1.2 THEORETICAL CONSTRUCTS AND THEIR RELEVANCE FOR ADOLESCENCE

For the present thesis I investigated both global self-esteem and two domains of self-esteem, namely physical appearance and academic achievement as important indicators of

adaptive development during the adolescent years and as representations of a growing identity (Rosenberg, 1979; Shavelson, Hubner & Stanton, 1976). Perceived physical appearance as domain-specific self-esteem was chosen because it reflects the rapidly changing body image adolescents have to cope with. Perceived academic competence might reflect the scholarly challenges typically associated with adolescence, such as how competent one sees him-/herself with regard to school work and career options. Thus, these domains reflect central and distinct (self-oriented) challenges to the teenage years. However, because not only self-related but also other-related changes and challenges occur during adolescence, a further interest lay in studying social development during this age period. I therefore investigated adolescent empathy development because it might be regarded as another indicator of successful adolescent development with respect to the social domain. Adolescent empathy development was chosen to predict later social outcomes in adulthood. In the following, the used theoretical constructs are introduced with regard to their relevance for the adolescent years.

1.2.1 GLOBAL SELF-ESTEEM AND DOMAIN-SPECIFIC SELF-ESTEEM

Global self-esteem refers to an overarching, general attitude towards oneself with clear evaluative components (Rosenberg, 1979). It is often defined as an individual's general feeling towards oneself (Rosenberg, Schooler, Shoenbach, & Rosenberg, 1995) well reflected in a statement such as *"I think I'm a person of worth"*. Domain-specific self-esteem reflects evaluations in concrete domains, referring to a person's physical appearance, academic competence or social skills, for instance *"I am good looking"* (O'Mara, Marsh, Craven, & Debus, 2006). Global self-esteem and domain-specific self-esteem are closely linked to each other and can be integrated in a multidimensional hierarchical model (Marsh, Craven, & Martin, 2006). Global measures of self-esteem correlate highly with the highest-order factor based on

the lower domains of self-esteem (Marsh & Hattie, 1996; Shavelson, Hubner & Stanton, 1976) but there are only moderate correlations between specific components of self-esteem "(…) so that much of the variance in domain specific factors (…) could not be explained in terms of higher-order self-concept factors or self-esteem (O'Mara, Marsh, Craven, & Debus, 2006, p. 182)". Furthermore, it is likely that different domains of self-esteem do not behave in the same way across time, therefore, both global self-esteem and domain-specific self-esteem measures are considered in the present thesis to detect possible differential developmental trajectories across the adolescent years. In Study 1, both global self-esteem and self-esteem of academic competence and physical appearance are investigated to better understand the developmental trajectories of these constructs and their individual relevance for mental health in adulthood. Academic competence is a crucial factor for adolescence – at least in this cohort and in the Western world – because individuals have to make career choices, invest in school work to achieve their aspired marks and develop a plan for their professional future. At the same time, adolescence is a time of sexual, hormonal and physical development leading to changes in one's body image typically accompanied by the emergence of sexual interests. Furthermore, individuals typically start to engage in first romantic and/or sexual relationships. Therefore, both global self-esteem and domain-specific self-esteem of physical appearance and academic competence were included in Study 1. I tested the differential developmental trajectories of these constructs and investigated whether both initial self-esteem level and change across the adolescent years predicted mental health both in adolescence itself and decades later in adulthood. We chose low depression rates as a reliable and general indicator of successful and healthy functioning in life.

1.2.2 SELF-ESTEEM AND DEPRESSION: THE VULNERABILITY AND SCAR MODEL

The absence of depression is an important indicator of mental health and has been found to be closely related to self-esteem, but the direction between the two constructs has been subject of ongoing debates (Orth & Robins, 2013). Two prominent theoretical frameworks have addressed this issue: Whereas the vulnerability model assumes that self-esteem functions as a predictor of depression (Beck, 1967, 1987), the scar model states the opposite, assuming that depression wounds individuals leaving permanent scars resulting in lower self-esteem (Shahar & Davidson, 2003; for an overview of the models see Zeigler-Hill, 2011). Low self-esteem may contribute to the development of depression by an increased sensitivity to rejection from relevant others, (e.g. romantic partners, friends or colleagues), by an excessive seeking for confirmation of one's self-worth, or by means of social isolation caused by anxiety of rejection through others (Joiner, Alfano & Metalsky, 1992; Murray, Homes, & Griffin, 2000; Ottenbrei & Dobson, 2004). Furthermore, rumination has been identified as a partial mediator between low self-esteem and depression, showing that individuals who perseveratively think about their own failures, losses, or inadequacies are at greater risk for developing depressive symptoms (Kuster, Orth, & Meier, 2012). The scar model, on the other hand, states that experiencing depression leads to changes in self-esteem, insofar as that relevant social relationships that contribute to self-esteem may be destroyed or weakened through depressive episodes (Orth, Robins, & Roberts, 2008). Within the individual, depression could lead to lower self-esteem because information about the self is processed in a different, more self-deteriorating way together with a selection and specific sensitivity to attend to negative information about the self (Rohde, Lewinsohn, & Seeley, 1990; Orth, Robins, & Roberts, 2008). Because self-esteem and depression have been linked in numerous studies, and because they are valid and general indicators of individual functioning, I used these constructs in two studies of the present thesis

to test their longitudinal validity over decades and across generations. Whereas Study 1 pays closer attention to the longitudinal validity of the vulnerability model across different developmental periods (adolescence to adulthood), Study 3 tests the competing models across three decades and across generations in order to test both the long-term and intergenerational validity of the competing models.

1.2.3 ADOLESCENT EMPATHY DEVELOPMENT AS A PREDICTOR OF SOCIAL OUTCOMES IN ADULTHOOD

Besides investigating rather self-focused resources such as self-esteem, I also aimed at integrating other-focused constructs that represent the relation of the developing adolescent to the changing social world around him or her. Adolescence is typically associated with an increased orientation towards peers in tandem with autonomy seeking in the original family (Bornstein, Jager, & Steinberg, 2012). Therefore, in order to study an aspect of the social self, the ability for perspective-taking and understanding others' feelings (Eisenberg & Fabes, 1990) – namely empathy – was included in the present thesis. The competence to share and understand others' thoughts and views becomes especially relevant during the adolescent years and has been shown to undergo developmental changes across the entire lifespan with interindividual differences in the degree and direction of empathy development (McDonald & Messinger, 2011; O'Brien, Konrath, Grühn, & Hagen, 2013). As outerfamilial social relationships increase, it is likely that social skills increase in relevance, too. Indeed, empathetic adolescents are shown to be more socially competent, more cooperative and more popular among peers (Eisenberg, Morris, McDaniel, & Spinrad, 2009). Thus, empathy seems to be an ideal indicator of high adjustment during an age period that entails manifold changes in the social domain. Typically for the first time in life, during adolescence, social relationships are maintained or newly

established without the supervision of the immediate family. Thus, the teenage years are a time during which individuals have a unique developmental chance to network based on their own social interaction competencies (Bornstein, Jager, & Steinberg, 2012, Erikson, 1968). As for self-esteem, the presence of interindividual differences in empathy development might be interpreted as a result of how successfully adolescents manage the social challenges typically experienced in adolescence that are relevant for the adult life (Erikson, 1968; Steinberg, 2008). The main underlying assumption for the study of adolescent empathy as a predictor of social competencies in adulthood was that the practice of perspective-taking, maintaining and establishing own friendship circles might provide individuals with a social resource that is likely to be effectual beyond adolescence, well into adulthood. In other words, coping well with this adolescent challenge might result in a positive developmental spiral that transfers into adulthood, leading to better social relationships, romantic relationships and friendship circles in adulthood (or conversely, lead to a vicious circle resulting in negative patterns that are carried along the lifespan). Dependent variables for investigating the outcomes of empathy development were therefore chosen on the basis of their importance for adult relationships, namely, social integration, communication skills, and relationship conflicts and satisfaction. Study 2, therefore, builds on the theoretical constructs of the other studies through the inclusion of aspects of the self that represent interaction competencies with relevant others.

1.3 METHODOLOGICAL CONSIDERATIONS

A longitudinal perspective is necessary to answer the aspired research questions. Based on the theoretical assumptions, predictions from earlier stages of the life on later life outcomes are made. Furthermore, one focus lies in understanding developmental processes during

adolescence by modeling developmental trajectories and testing prospective influential forces on these trajectories. Finally, intergenerational longitudinal associations between parents and their children are investigated – all these research aspirations call for unique data that cover a long time span as well as include different generations. The ongoing LifE-study (Lebensverläufe ins frühe / fortgeschrittene Erwachsenenalter; Fend, Georg, Berger, Grob, & Lauterbach, 2002; Fend, Lauterbach, Grob, Berger, Georg, & Maag-Merki, 2012) is one of a few unique data sets in Europe that allows to address these research aims. The LifE-study was initiated in 1979 by Prof. Dr. Helmut Fend and followed around 2000 individuals annually from age 12 to 16 covering various aspects of the developing adolescent, including social, cognitive, academic, and self-measures. In 2002, new collaborators joined Prof. Fends team and conducted a first follow-up wave when participants were 35 years old, two decades later. Finally, a second-follow-up measurement was conducted in 2012. The second follow-up measurement included the adolescent children of the main cohort. My collaboration in the project from 2011 to 2013 for the second follow-up measurement enabled me to use this unique data set for the present PhD thesis. The following sections provide an overview of the methods that my co-authors and I applied to answer the various research aims presented above.

Studies 1, 2, & 4: Latent growth curve model (LGCM; Curran & Hussong, 2003; Duncan & Duncan, 1995, McArdle & Epstein, 1987): One of the main research aims of the present thesis was to test whether there are *inter*individual differences in adolescent trajectories with respect to different domains of the self (self-esteem, perceived physical appearance, academic competence, empathy) and whether *change* reveals prospective power for important life outcomes, above and beyond initial *levels* in the investigated domains. Second-order latent growth models allowed us to address these research aims. Because the data used for this PhD thesis consisted of five measurement occasions in adolescence (Fend, 1990; Fend 1994) and

two follow-up measurement waves in adulthood (Fend, Georg, Berger, Grob, & Lauterbach, 2002; Fend, Lauterbach, Grob, Berger, Georg, & Maag-Merki, 2012), it was possible to model developmental trajectories and estimate both the influence of the initial level and the developmental change of the constructs as predictors for life outcome measures in adulthood. Furthermore, significant variance around the level and change factors would indicate that there are *inter*individual differences in starting level and developmental trajectory, meaning that individuals differ in how they start off and process through the adolescent years with respect to the investigated constructs. Factor loadings and intercepts of the corresponding indicators were set to be equal over time in order to ensure that constructs did not diverge in content. Latent growth curve models allow to include covariates in order to test the concurrent influences on the variables of interest, such as peer popularity or body mass index. Furthermore, different latent growth curve models can be linked to each other in order to test whether initial levels and developmental trajectories are associated over time (i.e. parenting and self-esteem trajectories may be associated). More specifically, initial level and change factors of the constructs are specified to correlate with each other and the change factor of construct B is regressed on the level of construct A (and vice versa) to see whether the starting point in construct A exerts power on the developmental trajectory of construct B (and vice versa).

Studies 3 & 4: Autoregressive cross-lag model (Jöreskog, Sörbom, & Magidson, 1979; Kenny, 1975). Autoregressive cross-lag models predict relations between constructs A and B while controlling for previous levels of the outcome of interest. The aim of these models is to explain the amount of variance due to cross-lagged effects ($A_{t1} \rightarrow B_{t2}$) that is not explained by the stability of B ($B_{t1} \rightarrow B_{t2}$). Furthermore, these models are an ideal test for assessing the direction of two constructs over time. That is, autoregressive and cross-lagged paths are specified for both constructs and in both directions. As mentioned above, there is clear evidence

for an association between self-esteem and depression, for example, but the relation between the constructs has been subject of an intensive debate (e.g. Orth & Robins, 2013). Autoregressive cross-lag models allow to test the direction of this relation whilst taking into account the previous level of the construct of interest.

Study 4: Latent difference score model (LDS; Ferrer & McArdle, 2003; McArdle, 2001; McArdle & Hamagami, 2001). As opposed to autoregressive cross-lag models, latent difference score models test mean-level changes rather than rank-order (relative ordering of individuals) changes over time. For this study, two processes (i.e., self-esteem and parent closeness) were linked to each other in a difference score model in order to test whether one process would lead to mean-level change in the other process. In other words, latent difference score models are able to test whether construct A at time 1 leads to change in construct B at the next measurement occasion and/or whether mean-level change in construct A leads to mean-level change in construct B (McArdle, 2009; Ferrer & McArdle, 2010).

Study 4: Enduring effects vs. revisionist model (Fraley, Roisman, & Haltigan, 2012). Fraley and colleagues developed these competing models in order to test two different ways of how a construct may exert power for later development in another construct. The enduring effects model tests the assumption that construct A influences construct B at one point (T1) in development and remains influential at all subsequent times (T2 … T^n). For example, according to this model, loving, warm and caring parenting influences a child's self-esteem at T1 and its influence persists across all later assessments of the child's self-esteem. The revisionist model, on the opposite, tests whether construct A impacts construct B at T1 but its influence is assumed to disappear over time, that is, A's influence on B may only be shown in the stability of B. That is, besides the indirect effect from A → B through the stability of B, there is no direct effect from A to B at all subsequent assessments of B.

2 SUMMARY: AIMS AND GUIDING ASSUMPTIONS

Based on the theoretical suggestion that adolescence is both a malleable and challenging age period with possible long-term implications for the individual across the lifespan and across generations, the following assumptions were examined:

First, adolescence is a sensitive and malleable age period that contains adjustments with regard to self-views (i.e. global self-esteem, self-esteem of academic competence, physical appearance and social skills). Second, age-specific challenges and the mode of dealing with these challenges are consequential beyond adolescence well into the adult years (long-term effect). Third, certain characteristics observed in one generation can be transmitted to the next generation, leading to a positive or negative developmental *inter*generational spiral. Finally, positive social interactions with relevant others (i.e. parents) can influence positive adolescent development.

Findings in this field of research contribute to a better understanding of *how the self develops during adolescence*, how adolescent *development influences adult life outcomes* and how *generations are linked* with regard to important characteristics of the self. Examining the power of the adolescent self as a predictor of important adult life outcomes is crucial insofar as such research helps to better understand whether and how adolescent patterns are consequential well beyond adolescence, in adulthood and across generations. These findings should thus be of considerable interest to professionals interested in promoting long-term productive, satisfying and healthy life styles.

3 STUDIES

3.1 STUDY 1: ADOLESCENT SELF-ESTEEM LEVEL AND CHANGE AS PREDICTORS OF DEPRESSION IN ADULTHOOD[2]

3.1.1 THEORETICAL BACKGROUND

Self-esteem is relevant for a number of important personal and social life outcomes. For example, high self-esteem predicts closeness in romantic relationships, better job performance, and academic achievement (Judge & Bono, 2001; Marsh & Craven, 2006; Murray, 2005). In contrast, low self-esteem predicts a number of maladaptive outcomes such as delinquency, poor physical and psychological health, and limited economic prospects (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005; Orth, Robins & Widaman, 2012; Trzesniewski et al., 2006; Zimmerman, Copeland, Shope, & Dielman, 1997). However, little is known about the predictive effects of developmental *change* in self-esteem on long-term consequential outcomes. Addressing change above and beyond self-esteem baseline level as a predictor of life outcomes is crucial because research has demonstrated that the self and personality change over time (e.g., Mroczek & Little, 2006; Roberts, Walton, & Viechtbauer, 2006; Trzesniewski, Donnellan, & Robins, 2003) and that these changes exert predictive power for such important life outcomes as mortality (Mroczek & Spiro, 2007), substance abuse (Hampson, Tildesley, Andrews, Luckyx, & Mroczek, 2010) or self-rated health (Turiano, Pitzer, Armour, Karlamangla, Ryff, & Mroczek, 2012). We therefore tested whether change in self-esteem is

[2] A similar version of this study has been published in the *Journal of Personality and Social Psychology* (Copyright notice: APA). This chapter may not exactly replicate the final version published in the APA journal. It is not the copy of record.

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related to depression, and whether the effects of self-esteem change are independent of self-esteem baseline level.

3.1.1.1 GLOBAL AND DOMAIN-SPECIFIC SELF-ESTEEM

Self-esteem is best characterized as an individual's global evaluation of his or her overall worth as a person. Domain-specific self-esteem refers to an individual's evaluation of him or herself in a specific domain (Epstein, 1973; Harter, 1999; Shavelson, Hubner, & Stanton, 1976). For this study, we were particularly interested in global self-esteem and in adolescents' self-evaluations in the domains of physical appearance and academic competence. These two domains are highly significant for the adolescent years because they reflect two central challenges confronting the developing adolescent – initiating romantic relationships and succeeding in school. For example, it is during adolescence that individuals begin to form career preferences and invest in their academic achievement and skills (Steinberg, 2008). Especially in Germany, many students complete their secondary education at the age of 16 and apply for apprenticeships. Furthermore, pubertal changes occurring during adolescence force boys and girls to adapt to and accept their changing physical appearance. These changes are often psychologically consequential because one's worth in these domains has to be newly evaluated, negotiated, and built up (Erikson, 1968).

Given the reorganization that takes place during adolescence, adolescents are prompted to show increased introspection in order to find out who they really are (and want to be), how they are perceived by their environment, and what they want to do and achieve in their lives (Steinberg, 2005). It can lead to later maladjustment if this *process of scrutinization* is not successful and an unstable identity is being built up (Erikson, 1968; Harter, 2006). Thus,

ignoring developmental trajectories in self-esteem during adolescence may neglect important aspects of an inherently dynamic construct (Greene & Way, 2005; Steinberg, 2005). Indeed, self-esteem has been shown to be especially malleable in adolescence (Demo, 1992; Steinberg, 2008; Trzesniewski et al., 2003). Furthermore, the relatively lower consistency of self-esteem during adolescence implies that it is more amenable to intervention during this developmental period (Robins, Trzesniewski, & Donnellan, 2012).

Taken together, it is important to consider adolescent change for several reasons: First, self-esteem and other personality traits are not entirely stable constructs but systematically change across the lifespan and especially during adolescence (e.g., Steinberg, 2008). Second, recent findings on the importance of studying change as a predictor revealed that change in certain personality domains influences important life outcomes. Third, malleability of self-esteem and personality traits allows for intervention programs within these constructs. If self-esteem is malleable during adolescence, practical interventions aimed at improving low self-esteem should be considerably more effective than if we assume stability of this construct over time. Such findings would further highlight the importance of intervening early in the lifespan, so that individuals do not endure decades of greater risk for important life outcomes such as mental health problems. In this study, we therefore investigated the prospective effects of *level and change* in self-esteem across adolescence on depressive symptoms assessed two decades later, when study participants were 35 years old.

3.1.1.2 SELF-ESTEEM LEVEL AND DEPRESSION

Several theoretical models suggest predictions about the longitudinal association between personality characteristics such as self-esteem and depression (Klein, Kotov, & Buffered, 2011;

Orth & Robins, 2012). First, one prominent theoretical model assumes that *level* of self-esteem is predictive for depression. The basic idea of the vulnerability model is that low self-esteem causally influences the onset and maintenance of depression (Beck, 1967; Metalski, Joiner, Hardin, & Abramson, 1993). This model assumes that individuals displaying dysfunctional attitudes or negative inferential styles about themselves are at greater risk for developing depressive symptoms. For example, when individuals with low self-esteem and thus dysfunctional attitudes towards themselves are confronted with negative feedback at work, they may think that their self-esteem depends on others' approval and thus feel worthless even after supportive criticism (Abramson, Metalsky, & Alloy, 1989; Beck, 1987).

Another mechanism could be that adolescents with low self-esteem are less likely to search for positive feedback from others (Cassidy, Ziv, Mehta, & Feeney, 2003). Furthermore, they may also use negative inferential styles after a failure. Negative inferential styles imply associating lack of success in a specific task with stable and global causes such as being generally incompetent instead of assuming that one was not successful at a specific task in a specific situation (Abramson et al., 1989). Hence, according to Beck's (1967) cognitive theory of depression, negative beliefs about oneself are a key cause in the etiology of depression. Several studies support the vulnerability model (e.g., Franck, De Raedt, & De Houwer, 2007; Orth, Robins, & Roberts, 2008; Orth, Robins, Trzesniewski, Maes & Schmitt, 2009). For example, Orth et al. (2009) demonstrated that low self-esteem acts as a risk factor for depression but not vice versa. Finally, Bolognini, Plancherel, Bettschart, and Halfon (1996) showed that domain-specific self-evaluations, specifically perceived physical appearance and social skills,

at age 12 and 14 were related to subsequent depressive mood, albeit with weaker effects than global self-esteem.[3]

3.1.1.3 SELF-ESTEEM CHANGE AND DEPRESSION

One unique feature of the present study is that we were able to test whether *change* in self-esteem predicts depression. To date, almost no research has been conducted on self-esteem change as a predictor of depression. However, considering psychological changes in the study of development is a key component in lifespan development theory (e.g., Baltes, Lindenberger, & Staudinger, 2006). Since there exist interindividual differences in intraindividual change, individuals may increase, decrease, fluctuate or remain stable in their intraindividual development (Alwin, 1994; Baltes, Reese, & Nesselroade, 1977; Mroczek & Spiro, 2003). Thus, individuals can differ with respect to the degree and direction of change (Mroczek & Spiro, 2005). We therefore assume that individual differences in change reveal substantial information that are relevant for later life outcomes because they reflect more or less successful adaptation to age-specific developmental tasks.

Indeed, adolescence has been characterized as a transitional period and a time of heightened self-exploration that *lays the foundation for later outcomes* (Erikson, 1968). Furthermore, it is often described as a vulnerable age period and thus a time of "(…) increased risk for the onset of a wide range of emotional and behavioral problems, including depression (…) Steinberg,

[3] Although the vulnerability model assumes that low self-esteem is a cause of depression, it is also possible that it is a consequence of depressive symptoms (see Rohde, Lewinsohn, & Seeley, 1990). This alternative model, typically referred to as the "scar" model, could not be tested in the present study because self-esteem was not assessed in adulthood. However, the scar model has been extensively tested in other studies and the prospective effect of depression on self-esteem is typically small or non-existent (Sowislo & Orth, 2012).

2005, p.69). Hence, due to the magnitude of change and the high number of challenges adolescents face, the adolescent years must be regarded not only as a transitional but also as a sensitive period that may lead to long-term consequences well beyond the adolescent years. In line with theory on adolescent identity formation as a *prerequisite for later life adjustments*, adolescents who are not able to process age-specific challenges adequately might be more prone to later health issues such as depressive symptoms in adulthood compared to individuals who develop a positive attitude towards themselves.

Thus, although a positive prerequisite, we assume that it is not necessary to initially possess high self-esteem baseline level at the beginning of adolescence. Rather, we argue that an individual's process through adolescence might be equally important for later life outcomes. In this line of reasoning, even adolescents with generally high self-esteem may be at risk for depression later in life if they decline to moderate levels in self-esteem, or conversely, even individuals with quite low self-esteem can reduce their risk for negative life outcomes if they increase to moderate levels in self-esteem. We emphasize change because it might be crucial to face difficulties, perceive them as a challenge and then overcome these difficulties. Success experiences with developmental tasks might give adolescents a genuine trust in themselves as worthy and able persons and, in turn, enable them to approach later challenges in a more positive, constructive, and self-affirmative way.

The question remains as to the mechanisms by which decreasing self-esteem predicts depression (or increasing self-esteem prevents depression). One potential pathway may be that decreasing self-esteem leads to the deteriorating of positive beliefs about oneself, which in turn, predict depression. For example, a girl may enter adolescence with high self-esteem but due to pubertal changes in her body-weight she might experience insecurities with regard to her changing body image. Thus, she has to adapt to her feminine body image and accept these

natural changes as part of becoming an adult. She might learn to define herself as a person of good qualities although her body image may not look as typically idealized in the media. Another girl with initial high level of self-esteem might not be able to cope with her natural gain in body weight during adolescence in an adaptive way, and thus experience increases in self-conscious thoughts, which, in turn, may deteriorate her initially high self-esteem in childhood.

Although previous research has documented that self-esteem is malleable during adolescence, very few studies investigated developmental change as a *predictor of life outcomes*. Zimmerman et al. (1997) demonstrated that individuals who decreased in self-esteem during their adolescent years were more prone to peer pressure, alcohol misuse, and tolerance for deviance during the four years of the study. Consistent with the vulnerability model, Kim and Chicchetti (2006) found that initial levels of self-esteem predicted changes in depression, whereas initial levels of depression did not predict changes in self-esteem. Finally, Bolognini et al. (1996) demonstrated that decreasing self-esteem – global and domain-specific – from age 12 to 14 was related to higher levels of depression at age 14. However, to date, no research has been conducted on the long-term consequences of adolescent self-esteem on adult depression over a time span of two decades.

In summary, we assume that not only initial level of self-esteem at the beginning of adolescence is relevant for later life outcomes but also how adolescent change during the age period between 12 and 16. Thus, adolescent trajectories of self-esteem development should provide prospective information for adult depression even when controlling for level of self-esteem in adolescence.

3.1.1.4 NORMATIVE SELF-ESTEEM DEVELOPMENT IN ADOLESCENCE

In addition to examining the relation between self-esteem and depression, the present study also provides further insights into the normative development of self-esteem during adolescence. A large body of research suggests that self-esteem generally decreases across the adolescent years (Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002; Robins & Trzesniewski, 2005; Zimmerman et al., 1997). This adolescent drop in self-esteem has been discussed as a consequence of maturational changes (puberty), cognitive changes (formal operational thinking), and contextual changes (school transitions) (Trzesniewski, Robins, Roberts, & Caspi, 2003). Adolescents typically begin to see themselves in a more critical and differentiated way, displacing the overly positive and holistic self-views ("I'm a good kid") they maintained in childhood (Harter, 1999). This more differentiated view of the self can lead to a drop in self-esteem because individuals have to integrate undesirable aspects of themselves into their self-concept. This process of integrating positive and negative characteristics should be resolved by the end of adolescence, leading to an increase in self-esteem at the beginning of adulthood (Robins & Trzesniewski, 2005).

Although the bulk of the evidence points to a drop in self-esteem during adolescence, there are some inconsistencies in the literature and several studies have found evidence for an increase (e.g., Demo, 1992; McLeod & Owens, 2004). Moreover, we know little about the developmental trajectory of domain-specific self-esteem during adolescence, and it is possible that the trajectory for these constructs diverges from that found for global self-esteem. Most important for the present study, the inconsistency in the findings suggests the presence of strong interindividual differences in self-esteem change, with some individuals showing increases, others showing decreases, and some showing no change at all. Thus, we expect to find interindividual differences in both the initial level and the developmental trajectory of self-

esteem from age 12 to 16. The process of integrating positive and negative aspects of the self might differ largely between individuals. This difference could be a consequence of the number of challenges an adolescent has to cope with (i.e., a large or small increase in body weight, high or low academic prerequisites at school), and on the magnitude and the subjective experience of these challenges.

Previous research found gender effects with respect to self-esteem development. A meta-analytic review by Kling, Hyde, Showers, and Buswell (1999) revealed that males report higher self-esteem, on average, than females, with the largest gender gap observed during adolescence. The gender difference may be explained by divergent socialization experiences such as a tendency to give boys more autonomy than girls, different gender roles such as self-confidence being more valued in boys, or a stronger cultural emphasis on girls' physical appearance, together with idealized body images portrayed in the media, which may lead to lower self-esteem in girls (Kling et al., 1999).

3.1.2 RESEARCH QUESTIONS AND AIMS OF THE STUDY

The present study investigated adolescent level and change in self-esteem and examined their predictive effects on adult depressive symptoms two decades later. This study extends previous research on the relationship between self-esteem and depression in several ways. First, almost no research exists on *change* in self-esteem as a predictor of depression. Previous research has often relied on examining potential consequences of either high or low *level* of self-esteem, largely ignoring the potential consequences of *change* within these constructs. We thus investigated the independent prospective effects of level and change in self-esteem during adolescence on depressive symptoms at age 35. Second, no research has tested the long-term

effects of adolescent self-esteem (level or change) on depression over decades. Previous research has relied on short-term longitudinal studies, examining the link between low self-esteem and depression over years rather than decades (cf. Sowislo & Orth, 2012)[4]. Instead, we tested the effects of adolescent self-esteem on adult depressive symptoms two decades later, spanning age 12 through to age 35 and thus, two different developmental stages. Third, most previous research has focused on global self-esteem and neglected domain-specific evaluations such as perceived physical appearance or academic competence. Since these domains are highly consequential during the transitional period of adolescence, we also tested models for these aspects of domain-specific self-esteem. Fourth, the present study uses data from a large, nationally representative sample for the used variables.

For this study, we first investigated level and change in global and domain-specific self-esteem during adolescence. Although most prior studies have found a mean-level decrease in self-esteem during adolescence, other studies have reported the opposite pattern, raising the possibility that we might find an increase, a decrease, or no change at all from age 12 to 16 years. More important, we expected to find substantial *individual differences* in level and change of self-esteem, suggesting that adolescents differ both in their initial level of self-esteem and in the shape and direction of their development. Second, we expected to find gender differences in self-esteem, with boys exhibiting higher levels of global self-esteem and more positive perceptions of their physical appearance and academic ability. Third, we examined the prospective effects of both level and change in adolescent self-esteem on depressive symptoms

[4] One exception is the study by Schafer, Wickrama, and Keith (1998), who found adult self-esteem level predicting depression in a small sample of 98 married couples over 13 years. However, this study only included two measurement occasions and did not focus on adolescent development as a predictor of adult depression.

in adulthood. We expected to replicate the vulnerability effect, such that adolescents with low self-esteem, and those showing declines in self-esteem over the course of adolescence, would be more prone to depressive symptoms two decades later.

To further clarify the prospective effects of self-esteem development on adult depression, we included three time-varying covariates: peer popularity, body mass index (BMI), and school grades (Cohen, Kasen, Chen, Hartmark, & Gordon, 2003). The rationale was as follows. According to the sociometer theory (Leary & Baumeister, 2000), global self-esteem can be regarded as a sociometer to monitor how much a person is valued by significant others. Thus, when members of desirable groups or social relationships value one's relational status as low, self-esteem should be low too. Indeed, research supports the assumption that peer popularity is related to higher self-esteem (e.g., Litwack, Aikins, Cillessen, 2012; Thomaes et al., 2010). As peers play an increasingly important role in adolescence, we included peer-rated popularity as a time-varying covariate (at all measurement occasions in adolescence) in our analyses to test for peer influences on global self-esteem (see Figure 1). For domain-specific self-esteem we included time-varying covariates that are directly linked to the respective domains. First, as previous research suggests a negative association between BMI and both perceived physical appearance and depression (O'Dea, 2006; Mustillo, Hendrix, & Schafer, 2012), we controlled for the potential influence of BMI when examining the effects of physical appearance on depressive symptoms. Second, as previous research demonstrates a positive association between academic achievement and perceived academic competence (Guay, Marsh &, Boivin, 2003; Marsh & Craven, 2006), we included the participants' school grades as an annual covariate when examining the effects of perceived academic competence.

3.1.3 METHOD

3.1.3.1 PARTICIPANTS

Data came from the German LifE-study (Fend, Georg, Berger, Grob, & Lauterbach, 2002).[5] Participants (N = 2,054) were assessed five times during adolescence at the age of 12 (T1: 1979), 13 (T2: 1980; N = 2,047), 14 (T3: 1981; N = 2,003), 15 (T4: 1982; N = 1,952), and 16 years (T5: 1983; N = 1,790). A follow-up assessment was conducted in adulthood when participants were 35 years old (T6: 2002). From the initial study participants, 74% (N = 1,527) participated at T6. The adolescent participants are broadly representative of the Western German population with regard to socioeconomic status, gender, ethnic origin, urban vs. rural place of residence, and education level (in Germany pupils are divided in separate school levels according to their academic performance in primary school) (see Fend, Berger, & Grob, 2009, for details). Study members who participated in the age 35 assessment did not differ from the original adolescent sample on any of the key variables of this study, including depressive symptoms at age 16, or global and domain-specific self-esteem at ages 12 to 16 (see Fend et al., 2009).

[5] Lebensverläufe von der späten Kindheit ins frühe Erwachsenenalter (LifE). Die Bedeutung von Erziehungserfahrungen und Entwicklungsprozessen für die Lebensbewältigung – Follow-Up zur Konstanzer Jugendlängsschnitte ‚Entwicklung im Jugendalter'(Authors: Fend, Georg, Berger, Grob & Lauterbach, 2002). [Pathways from Late Childhood to Adulthood. Context and Development in Adolescence as Predictors of Productive Life-Courses (*L*ebensverläufe *i*ns *f*rühe *E*rwachsenenalter: LifE)]

3.1.3.2 MEASURES

Global self-esteem. Self-esteem in adolescence was measured with eight items from the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1979). Participants rated each item on a dichotomous scale (0 = *disagree*, 1 = *agree*). The items were summed to create a total score (potential range: 0 to 8). Kuder-Richardson (1937) reliability estimates (KR-20) ranged between .72 and .77 for the five measurement occasions.

Domain-specific self-esteem: Physical appearance and academic competence. Each self-esteem domain was measured with six items. "Compared to others I'm pretty attractive" (perceived physical appearance) and "Even when trying hard, I can't achieve what others can do easily" (perceived academic competence). The items are conceptually comparable to the Perceived Competence Scale for Adolescents (PCS; Harter, 1982; Wünsche & Schneekind, 1989). Participants rated each item on a dichotomous scale (0 = *not true for me*, 1 = *true for me*). The items were summed to create scores ranging from 0 to 6. The reliability estimates (KR-20) ranged from .65 to .72 for physical appearance and from .77 to .82 for academic competence.

Depression. At age 16 (T5: 1983), 13 items from the original Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) were used to measure depressive symptoms (depressive symptoms were not measured in the age 12 to 15 assessments). Participants were asked how often they had experienced depressive symptoms during the preceding week. Participants indicated which sentence out of four possible answers reflected their feeling most accurately. This was done for each of the 13 symptoms. An example item is "I'm not feeling sad at all" (1) to "I'm extremely sad and unhappy; I can hardly bear it" (4). The alpha reliability estimate was .89.

In adulthood (T6: 2002), seven items from the BDI-V (Schmitt & Maes, 2000) were used to measure depressive symptoms. Compared to the original BDI, the simplified version BDI-V only consists of 20 items (as opposed to the original version consisting of four gradually increasing sentences with regard to severity for each symptom). Comparison of the original scale with the new version revealed that both versions correlated equally high with self-reported depression and expert ratings of depression (Schmitt, Beckmann, Dusi, Maes, Schiller, & Schonauer, 2003). Furthermore, they discriminated depressed and non-depressed individuals equally well and the two versions had a high correlation both on the level of sum scores (r = .91) and on the level of symptoms (r = .70) (Schmitt et al., 2003). Thus, the different question formats revealed similar results. For T6 of the LifE-study, seven items of this simplified version of the BDI-V were used. In Appendix A, we provide an overview of the seven items that were extracted from the original 20-item scale of the BDI-V and the 13 items from the original BDI.

Participants were asked how often they typically experience depressive symptoms. Participants rated each item on a 6-point Likert-type scale (1 = *never*, 6 = *always*). Example items were "I'm sad," or "I'm thinking of hurting myself." The alpha reliability estimate was .84. The stability of depression between age 16 and 35 was r = .15, p < .01. Only correlating the seven corresponding symptoms of the two scales revealed a stability of depression between age 16 and 35 of r = .17, p < .01.

Time-varying covariates. We controlled for three variables when examining the effects of self-esteem on depression. First, we controlled for peer popularity when examining the effect of global self-esteem. Peer popularity was rated through peers of the same school class. Pupils were given a complete list of their peers of their school class and they were instructed to read the list and then indicate a maximum of five peers that they liked the most. Thus, every adolescent received a sum score of his or her popularity (e.g., if an adolescent was listed three

times as being liked, this pupil received the score "3"). On average, pupils received around three votes from their peers ($M_{T1\text{-}T5}$ ranged from 2.78 to 3.51, $SD_{T1\text{-}T5}$ ranged from 2.14 to 2.47) but variability in peer popularity was high, ranging from 0 to 18 for all measurement occasions.

Second, we controlled for body mass index (BMI) when examining the effect of perceived physical appearance. BMI, the individual's weight divided by the square of his or her height, was assessed at ages 13, 14, 15, and 16. Height and weight were measured using self-report categories (e.g., "height between 151-155 centimeters", or "weight between 46-50 kilograms"). We used the average estimate of each category (e.g., 153 centimeters for the category "height between 151-155 centimeters") as proxies in order to calculate the individual BMI.

Third, we controlled for the grades that participants had received during the five-year school period when examining the effect of academic competence. Participants indicated their grades at the ages of 12 to 16 years (1 = *lowest grade*, 5 = *highest grade*). Grades were measured at each measurement occasion in adolescence using the sum scores of the subjects Mathematics, German, and English (potential range: 3 to 15).

3.1.3.3 PLAN OF ANALYSIS

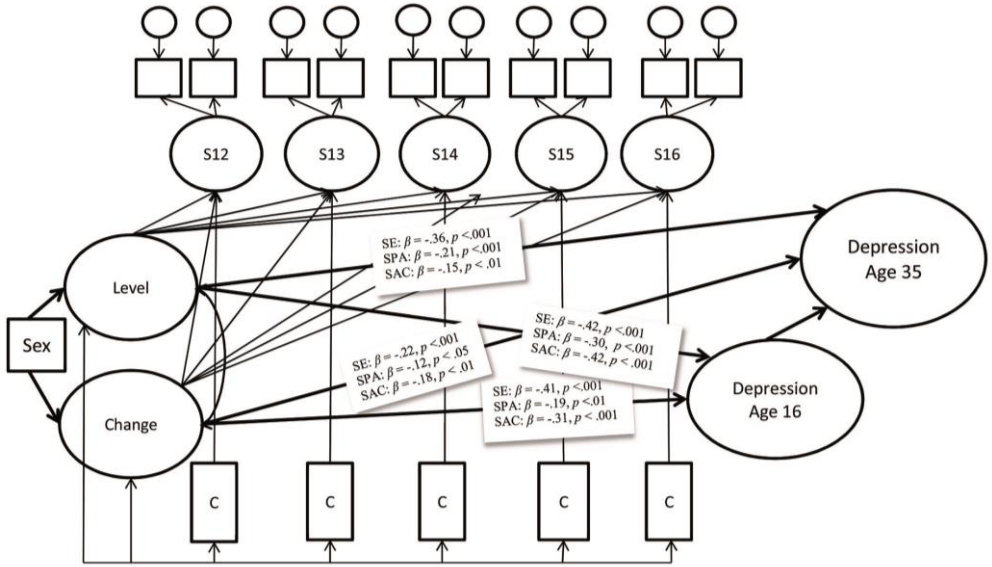
We used second-order latent growth models (LGM) to test our hypotheses (Curran & Hussong, 2003; Duncan & Duncan, 1995). These models were used instead of standard latent growth models because unreliability of the measured items can lead to an underestimation of change. One of the advantages of second order latent growth modeling lies within the latent assessments of repeated measures instead of manifest variables. Because these models analyze change at the latent rather than at the observed level, this approach allows controlling for measurement error when analyzing structural relationships. We estimated LGMs over the five measurement occasions separately for global and domain-specific self-esteem, using Full Information Maximum Likelihood (FIML) estimation in Mplus 5.2 (Muthen & Muthen, 2008). We used two parcels (sum of 4 items for self-esteem, sum of 3 items for the domain-specific self-esteem) as indicators per constructs over time (see Figure 1). Parcels were built using the item-to-construct balancing method (Little, Cunningham, Shahar, & Widaman, 2002).

We followed the suggestions by Muthen and Muthen (1998-2010) to specify second-order latent growth curve models with multiple indicators. That is, factor loadings and intercepts of the corresponding indicators were constrained to be equal over time. Based on suggestions by Geiser (2011) we also specified an indicator specific effect for the second indicator (see Figure 1). This approach, in contrast to auto-correlating error variables of the same indicators (Lance, Noble, & Scullen, 2002; Cole & Maxwell, 2003), provides a way to statistically separate indicator specific effects and error variance. The traditional correlated-uniqueness-models (Lance et al., 2002), where errors of the same indicators are correlated, do not allow for this separation. Thus, error variance and indicator specific effects remain confounded which generally leads to an underestimation of the indicators (Eid, Schneider, & Schwenkmezger, 1999; see Geiser, 2011 for details).

We performed the analyses in three steps. First, we estimated level and change for global self-esteem and for the two self-esteem domains. In addition to average estimates, we were particularly interested in individual differences in level and change. Significant variance in level would indicate that individuals differ in their initial levels of self-esteem whereas significant variance in change would suggest that adolescents differ in their developmental trajectory. Second, we examined gender effects on level and change in global and domain-specific self-esteem. Third, we investigated the predictive effects of level and change on depressive symptoms at age 16 and age 35 (see Figure 1). We included peer popularity as a time-varying covariate for global self-esteem, BMI as a time-varying covariate for perceived physical appearance, and school grades as a time-varying covariate for perceived academic competence (see Figure 1).

FIGURE 1 - LATENT GROWTH CURVE MODEL STUDY 1

Second order latent growth curve model for self-esteem (labeled S12 to S16 for each of the three measured models) and the prediction of depressive symptoms at age 16 and 35. The time-varying covariates (labeled C) for global self-esteem are peer popularity and for the domain-specific self-esteem (i.e., perceived physical appearance and academic competence) body mass index and school grades, respectively. Main results are presented for global self-esteem (SE), domain-specific self-esteem of academic competence (SAC) and perceived physical attractiveness (SPA).



3.1.4 RESULTS

Table 1 presents the means, standard deviations, and reliability estimates for the study variables. Table 2 includes the correlations between the three constructs and the test-retest correlations. The global self-esteem scale was moderately stable over time with correlations of .58 (age 12 to 13), .59 (age 13 to 14), .63 (age 14 to 15), and .58 (age 15 to 16), all $p < .001$. Test-retest correlations are only minimally lower to what is typically expected for global self-esteem in an adolescent sample (Trzesniewski et al., 2003). These slightly lower stability correlations may be due to the shorter version of the RSES used in this study, however, as research has shown, reasonable measures of self-esteem are even possible with a single item (Robins, Hendin, & Trzesniewski, 2001). The two self-esteem domains were moderately stable over time, both for the domain of academic competence [.52 (age 12 to 13), .58 (age 13 to 14), .57 (age 14 to 15) and .66 (age 15 to 16)] and for the domain of physical appearance [.52 (age 12 to 13), .65 (age 13 to 14), .69 (age 14 to 15), and .74 (age 15 to 16)] (see Table 2).

TABLE 1: DESCRIPTIVES OF STUDY 1

Descriptive Statistics and Reliability Estimates (KR-20) for Global Self-Esteem and Domain-Specific Self-Esteem

	T1: 12 years		T2: 13 years		T3: 14 years		T4: 15 years		T5: 16 years	
	M (*SD*)	KR-20	*M* (*SD*)	KR-20	*M* (*SD*)	KR-20	*M* (*SD*)	KR-20	*M* (*SD*)	KR-20
Self-esteem[a]	5.66 (1.97)	.73	5.48 (2.12)	.72	5.74 (2.10)	.77	5.89 (2.09)	.77	6.05 (2.02)	.77
Physical appearance[b]	3.78 (1.68)	.65	3.87 (1.75)	.69	4.03 (1.76)	.72	4.07 (1.76)	.72	4.18 (1.73)	.72
Academic competence[b]	4.22 (1.86)	.77	4.33 (1.87)	.79	4.63 (1.77)	.80	4.69 (1.73)	.79	4.82 (1.72)	.82

Note. N = 1,527. [a] Scale ranged from 0 to 8; [b] Scale ranged from 0 to 6.

TABLE 2: ZERO-ORDER CORRELATIONS OF STUDY 1

Correlations between Global Self-Esteem and Domain-Specific Self-Esteem

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
T1															
1. SE	—														
2. SPA	.597	—													
3. SAC	.504	.315	—												
Peer Popularity	.144	.175	.124												
Body Mass Index[a]	-	-	-												
School grades	.085	.090	.312												
T2															
4. SE	.578	.422	.353	—											
5. SPA	.447	.518	.292	.597	—										
6. SAC	.399	.249	.523	.508	.403	—									
Peer Popularity				.123	.105	.078									
Body Mass Index				-.092	-.222	-.078									
School grades				.112	.017	.245									
T3															
7. SE	.512	.384	.299	.585	.513	.384	—								
8. SPA	.419	.474	.177	.421	.654	.339	.605	—							
9. SAC	.341	.203	.423	.391	.333	.576	.529	.436	—						
Peer Popularity							.091	.125	.036						
Body Mass Index							-.052	-.164	-.029						
School grades							.032	-.030	.194						
T4															
10. SE	.454	.385	.272	.522	.448	.317	.626	.455	.460	—					
11. SPA	.382	.366	.227	.435	.589	.286	.489	.690	.295	.583	—				
12. SAC	.271	.188	.373	.306	.224	.448	.377	.347	.570	.511	.346	—			
Peer Popularity										.044	.064	.109			
Body Mass Index										-.083	-.097	-.025			
School grades										.047	-.032	.233			
T5															
13. SE	.348	.267	.201	.465	.383	.255	.530	.418	.364	.582	.471	.377	—		
14. SPA	.334	.385	.175	.417	.571	.286	.491	.681	.277	.529	.740	.374	.596	—	
15. SAC	.232	.128	.301	.309	.216	.413	.331	.304	.563	.432	.304	.659	.460	.369	—
Peer Popularity													.066	.052	-.027
Body Mass Index													.011	-.156	.050
School grades													.035	-.069	.205

Note. SE = global self-esteem, SPA = self-esteem of physical appearance, SAC = self-esteem of academic competence, [a]Body Mass Index was not measured at T1. All correlations are significant, $p < .01$. The three different gray colors indicate stability coefficients; dark grey (= SE), middle grey (= SPA), light grey (= SAC).

First, we estimated a latent growth model for each of the three constructs using five measurement points from age 12 to 16. Each model evidenced good fit: global self-esteem, $\chi 2$ (39) = 98.80, $p < .001$, CFI = .987, RMSEA = .032 (90% CI = .024-.040), physical appearance, $\chi 2$ (39) = 89.52, $p < .001$, CFI = .988, RMSEA = .029 (90% CI = .021-.037), and academic competence, $\chi 2$ (39) = 79.48, $p < .001$, CFI = .992, RMSEA = .026 (90% CI = .018-.034). Table 3 presents means, variance estimates, and the level-change correlations for each of the three constructs. The results demonstrated increases in both global and domain-specific self-esteem across adolescence. Moreover, the variances of the level parameters were significant for all three constructs, indicating that participants differed in their initial levels of how positively they see themselves. More important, significant variances were found for each change parameter, suggesting individual differences in change. That is, participants differed in the shape and direction of their development.

TABLE 3: MODEL ESTIMATES OF LATENT GROWTH CURVE MODEL OF STUDY 1

Model Estimates from the Latent Growth Models for Global Self-Esteem and Domain-Specific Self-Esteem

Note. N = 1,527. $r_{L,C}$ = correlation between level and change.

	Level		Change		
	M	*Variance*	*M*	*Variance*	$r_{L,C}$
Self-esteem	3.59***	.642***	.301***	.031***	-.401***
Physical appearance	2.99***	.450***	.192**	.021***	-.319***
Academic competence	2.92***	.517***	.377***	.036***	-.416***

**p < .01, ***p < .001.

For our second research aim, we included gender in the LGC models. Model fit continued to be good for all three constructs: global self-esteem, $\chi 2$ (46) = 109.81, p < .001, CFI = .987, RMSEA = .030 (90% CI = .023-.037), physical appearance, $\chi 2$ (46) = 100.65, p < .001, CFI = .988, RMSEA = .028 (90% CI = .020-.035), and academic competence, $\chi 2$ (46) = 91.94, p < .001, CFI = .991, RMSEA = .026 (90% CI = .018-.033). We found significant gender differences in self-esteem level; males reported higher levels of global self-esteem than females (β = .21, p < .001), as well as more positive perceptions of their physical appearance (β = .22, p < .001), and academic competence (β = .22, p < .001). However, no significant gender difference emerged for the change parameters. Thus, adolescent females have lower self-esteem than males but follow the same trajectory across adolescence.

Finally, for our main research aim, we estimated three separate second order LGC models to test the effects of level and change in self-esteem from age 12 to 16 on depressive symptoms at age 16 and 35. Table 4 and Figure 1 present the results of these analyses. As mentioned above, for global self-esteem we included peer popularity as a time-varying covariate and for physical appearance and academic competence we included BMI and school grades, respectively, as time-varying covariates. We also controlled for the effects of gender. Correlations between the domain-specific self-esteem of physical appearance and academic indicated that these constructs differ between individuals, revealing only small to medium-sized correlations (see Table 4).

We first tested the effects of global self-esteem development on depressive symptoms at age 16 and 35, with peer popularity as a time-varying covariate. The model fit well, χ^2 (159) = 278.94, $p < .001$, CFI = .984, RMSEA = .022 (90% CI = .018-.026). We found medium-sized effects of self-esteem level on depressive symptoms at age 16 and at age 35 (see Figure 1 and Table 4). Furthermore, self-esteem change had small to medium-sized effect on depressive symptoms at age 16 and at age 35, controlling for age 16 depressive symptoms (see Figure 1 and Table 4). Interestingly, the effect of self-esteem level remained similarly strong even twenty years after the measurement of self-esteem in adolescence, and even though we are predicting age 35 depressive symptoms controlling for age 16 depressive symptoms. These results were not affected by the inclusion of peer popularity as a time-varying covariate.

TABLE 4: BETA-COEFFICIENTS OF LATENT GROWTH CURVE MODELS OF STUDY 1

Level and Change in Global Self-Esteem and Domain-Specific Self-Esteem as Predictors of Depression at Age 16 and 35

Predictors	Depression age 16	Depression age 35
With covariates		
Peer popularity, body mass index & school grades		
Self-esteem level	-.42***	-.36***
Self-esteem change	-.41***	-.22***
Physical appearance level	-.30***	-.21***
Physical appearance change	-.19**	-.12*
Academic competence level	-.42***	-.15**
Academic competence change	-.31***	-.18**
Without covariates		
Self-esteem level	-.41***	-.35***
Self-esteem change	-.40***	-.22***
Physical appearance level	-.29***	-.21***
Physical appearance change	-.20**	-.11
Academic competence level	-.43***	-.15**
Academic competence change	-.31***	-.15**

Note. N = 1,527. Standardized beta coefficients from the latent growth curve models.

**p < .05, **p < .01, ***p < .001.*

We next examined the effects of level and change in perceived physical appearance on depressive symptoms at age 16 and 35, with BMI as a time-varying covariate. Again, model fit was good, χ^2 (145) = 257.88, $p < .0001$, CFI = .983, RMSEA = .023 (90% CI = .018-.027).

Adolescents' perceptions of their physical appearance predicted depressive symptoms both at age 16 and at age 35; for depressive symptoms at age 35, we controlled for age 16 depressive symptoms (Table 4). Moreover, change in perceived physical appearance predicted depressive symptoms at age 16 and 35, controlling for age 16 depressive symptoms (Table 4). The inclusion of BMI as a covariate did not significantly alter these effects.

Our third model examined the effects of level and change in perceived academic competence on depressive symptoms at age 16 and 35, with school grades as a time-varying covariate. Model fit was good, χ^2 (156) = 216.10, $p < .0001$, CFI = .992, RMSEA = .016 (90% CI = .010-.021). Adolescents' perceptions of their academic competence predicted depressive symptoms at age 16 and 35, controlling for age 16 depressive symptoms (Table 4). Moreover, change in perceived physical appearance predicted depressive symptoms at age 16 and 35, controlling for age 16 depressive symptoms (Table 4). The inclusion of school grades did not significantly alter these effects. Finally, we tested all these models without the inclusion of the time-varying covariates in order to see whether results differed in any way. However, all effects remained virtually identical (see Table 4).

One possible critique is the fact that two different measures of depression were used at age 16 (T5) and age 35 (T6). In order to address this critique, we extracted the conceptually equal seven items measured at T5 and T6 and additionally ran the same analysis as reported in this article using these overlapping items, revealing very similar results. Our model of self-esteem on depression using only these seven corresponding items again showed a satisfactory model

fit χ^2 (375) = 920.91, p < .001, CFI = .947, RMSEA = .031 (90% CI = .028-.033) and results remained virtually identical. Again, we found medium-sized effects of self-esteem *level* on depressive symptoms at age 16 (β = -.41, p <.001) and at age 35 (β = -.36, p <.001). Additionally and equal to our original analysis, also self-esteem *change* had small to medium-sized effects on depressive symptoms at age 16 (β = -.40, p <.001) and at age 35 (β = -.21, p <.001). For this analysis, we tested the exact same model as our original model with the only change of excluding those items that had no corresponding items tested at age 35, thus we reduced the depression scale age 16 from 13 to those seven symptoms that were tested in the follow-up survey (T6) at age 35. Analysis for the two domains of self-esteem also evidenced virtually identical findings as to our original analysis.[6]

In summary, these findings demonstrate the power of positive self-esteem development to reduce risk for depressive symptoms both in adolescence and two decades later in adulthood.

[6] Model fit of the self-esteem of physical appearance (SPA) *with only the seven corresponding depression items at age 16 and 35* was well too, χ^2 (355) = 809.90, p < .001, CFI = .953, RMSEA = .029 (90% CI = .026-.032) and the findings remained virtually identical. Again, we found small to medium-sized effects of self-esteem *level* on depressive symptoms at age 16 (β = -.27, p <.001) and at age 35 (β = -.21, p <.001). Additionally and equal to our original analysis, also self-esteem *change* revealed significant effects on depressive symptoms at age 16 (β = -.18, p <.01) and at age 35 (β = -.13, p <.05). In all our models we controlled for depression at age 16 on depression at age 35, again revealing a small effect from age 16 to 35 (β = .14, p <.01). The same was true for the adapted model of self-esteem of academic competence (SAC). We again only included the *seven corresponding depression items at age 16 and 35*. Model fit was well, χ^2 (375) = 847.01, p < .001, CFI = .955, RMSEA = .029 (90% CI = .026-.031) and again, results remained virtually identical compared to our original model. We again found small to medium-sized effects of self-esteem *level* on depressive symptoms at age 16 (β = -.43, p <.001) and at age 35 (β = -.13, p <.01). Additionally and equal to our original analysis, also self-esteem *change* revealed significant effects on depressive symptoms at age 16 (β = -.30, p <.001) and at age 35 (β = -.16, p <.01). Again, depression at age 16 has a small effect on depression at age 35 (β = .12, p <.05).

3.1.5 DISCUSSION

The primary aim of this study was to test the hypothesis that both level and change in self-esteem during adolescence predict depressive symptoms two decades later. Using prospective data over a 23-year time span collected from a large sample in Germany, three important findings emerged. First, we found significant increases in global self-esteem and in two self-esteem domains (i.e. perceived physical appearance and academic competence) across the adolescent years. The question of how, and whether, self-esteem changes during adolescence has been discussed controversially. According to maturation theories (cf. Gecas, 2004; Harter, 1999), gains in physical, social, and cognitive competencies should promote increases in self-esteem. Another reason for an increase of self-esteem in this sample could be that – unlike in the USA – German pupils usually experience the transition to secondary school/high school earlier, at the age of 10 or 11. German pupils therefore might not experience the same academic stress during adolescence as American students do because this transitional period has already been processed. More important, we found significant variances for global and domain-specific self-esteem change parameters, indicating that adolescent self-esteem trajectories vary in shape and directions between individuals.

Second, we found gender differences in self-esteem levels, with males reporting more positive self-evaluations for all three constructs. This finding is consistent with current research on the relation between gender and self-esteem (e.g., Kling et al., 1999). For our third research aim, we tested the predictive effect of self-esteem level and change on adult depressive symptoms. In line with longitudinal research showing that low adolescent self-esteem level predicts a number of adult life outcomes, such as limited economic prospects and poor health (e.g., Trzesniewski et al., 2006), we found small to medium-sized effects of self-esteem level on depressive symptoms two decades later. Our findings support the notion that both adolescent

global and domain-specific self-esteem level have predictive validity for important mental health outcomes in adulthood. This finding counters Baumeister, Campbell, Krueger, and Vohs' (2005) conclusion that self-esteem is not useful in predicting life outcomes. However, as pointed out by Baumeister et al., most studies have methodological problems such as small sample sizes or cross-sectional designs. We used both a large sample size and a long time span of 23 years to test these effects.

Most importantly, compared to earlier studies that focused on self-esteem *level*, we further found significant effects of self-esteem *change* on depressive symptoms at age 35 – over and above the effect of self-esteem level. Individuals who decreased in self-esteem during adolescence exhibited more depressive symptoms two decades later, in adulthood. To date, change estimates have been underrepresented in studies of long-term life development. Prior studies have documented a significant link between low self-esteem level and depression (e.g., Orth et al., 2009). This study clearly advanced previous work by further revealing that it is not just level but also change in self-esteem that has predictive power for adult depression. Furthermore, we contributed to the literature by examining the self-esteem domains of perceived physical appearance and academic competence. These domains represent typical developmental tasks to the adolescent years as individuals have to adapt to physical and hormonal changes and choosing among career possibilities during that age period. We wanted to differentiate between facets of adolescent challenges in order to detect what exactly drives the association between low or decreasing self-esteem and adult depression. This knowledge helps us to better understand which domains of self-esteem contribute to the vulnerability effect and for whom low self-esteem is a risk factor for depression. Furthermore, such knowledge facilitates to design interventions. For example, decreasing self-esteem in perceived academic

competence might call for a specific intervention program at school, targeting that particular domain of self-esteem which is about to develop into a risk factor for later depression.

Although the current study included a large sample size and a long time span to study the effects of adolescent development on adult life outcomes, several limitations should be noted. First, the measures were all based on self-reports. However, because self-esteem is by definition a subjective construct, it is impossible to measure it by objective criteria and consequently well-validated self-report scales are often considered the gold standard for assessing self-esteem (Robins, Trzesniewski, & Schriber, 2008; Sowislo & Orth, 2012). Furthermore, other methods of assessing self-esteem, such as implicit measures, have been criticized due to lack of validity (Buhrmester, Blanton, & Swann, 2011). In contrast, for depressive symptoms, it would be useful to include informant-based (e.g., clinician) measure to control for possible self-report biases (e.g., an unwillingness to acknowledge the symptoms of depression) and to account for the effects of shared method variance on the associations between self-esteem and depression. Note, however, that shared method variance is unlikely to account for the effects of self-esteem on age 35 depression, because some self-report method variance has already been statistically removed by controlling for prior levels of depressive symptoms.

Another constraint concerns the measurement of depressive symptoms during adolescence. First, depressive symptoms were only collected at one measurement wave at age 16. This design did not allow us to test for effects of depressive symptoms on self-esteem as suggested by Rohde, Lewinsohn, and Seeley (1990). Therefore, we only tested the vulnerability model, which proposes that low self-esteem is a cause rather than a consequence of depression (e.g., Beck, 1987). However, the causal relationship between self-esteem and depression has been tested in a number of longitudinal studies, all indicating that self-esteem functions as a predictor of depression and not vice versa (e.g., Orth & Robins, 2012). Second, the adult measure of

depressive symptoms in this study lacks diagnostic clinical value. In the follow-up survey, we were restricted to seven items indicating depressive symptoms. Thus, we can only relate self-esteem to a continuum of symptoms of depression without being able to clinically diagnose major depressive disorder, since this scale does not define a cut-off value to diagnose depression. Hence, it may be necessary in future studies to include clinical measurement tools in order to predict major depressive disorders as a consequence of self-esteem development.

Furthermore, it would be valuable to have the same measure of depression in adolescence and adulthood. Depression was assessed more state-like at age 16 (original BDI) compared to a more trait-like measure at age 35 (simplified version of BDI; BDI-V). Note however, that the BDI-V scale is developed on the basis of the original BDI. Furthermore, the two scales have been compared extensively by Schmitt et al. (2003), clearly showing high convergent validity and a similar pattern of external correlates, confirming that they have a similar nomological network. Ideally, however, the two scales would be assessed and compared over time to see if they behave identically. Future studies might address this issue. Related to this, the question remains whether depression should be defined and assessed as a state-like or trait-like construct. Clinical psychologists usually define depression as a state-like construct whereas personality psychologists conceptualize depression having both state and trait components. As shown in a study using longitudinal modeling of depression scores across adolescence and adulthood, most of the variance in depression is due to a trait and not to a state component (Cole & Martin, 2005). One further possible critique is that using a trait-like measure of depression at age 35 might cause an increase of the association between adolescent self-esteem and depression. Note, however, that the correlation spans two decades from adolescence when individuals experience considerable changes in their personality and/or affect, to adulthood.

A further issue should be mentioned with respect to domain-specific self-esteem. We used the two domains self-esteem of appearance and academic competence because they are central to adolescent experiences. How adolescents see themselves in terms of academic competence can be crucial when applying for a job. In Germany, at the age of 16, many students finish school and apply for apprenticeships. We believe that these experiences are important challenges and represent some of the major developmental tasks during adolescence. The self-esteem domain of perceived physical appearance was integrated in our analysis because adolescence brings along a number of physical changes such as changes in body weight and height or hormonal changes and body maturation. Changes in body image need to be accepted in order to find a good attitude towards oneself. As we have seen, both self-esteem domains play indeed a critical role for life outcomes. However, even though the chosen self-esteem domains are highly important, future studies could additionally test other domains of self-esteem. Indeed, one should consider to integrating domains of self-esteem such as perceived interpersonal skills. It is during adolescence, that individuals typically start to build up stable outerfamilial relationships such as peer friendships or first romantic relationships. Therefore, these social changes in the environment might affect how adolescents see themselves with regard to interpersonal skills and, in turn, could be predictive of long-term life outcomes. Having succeeded in building up and maintaining social relationships during adolescence might be another important root of adaptive adjustment later in life.

Future studies might also consider to include classical personality traits such as neuroticism as a third variable as neuroticism might explain some of the variance in the prediction of depressive symptoms in adulthood. Unfortunately, we were unable to include personality measures as they were not measured in the present study. However, we controlled for prior levels of depression in all our models, which is a central component of the neuroticism/negative

affectivity construct that has been discussed as empirically overlapping with low self-esteem and depression (cf. Watson, Suls, & Haig, 2002).

Finally, future studies might extend our research by including moderator variables. For example, it could be that an individual's school grades differ from his/her perception of academic competence and it would be interesting to see if a discrepancy between the subjective perception and the objective evidence leads to maladaptive outcomes. By including moderators we might be able to uncover even more complex associations between self-esteem and mental health.

Overall, this study provides one of the first long-term findings of effects of adaptive self-esteem development during adolescence on long-term health outcomes in adulthood. To the best of our knowledge, no other study tested for effects of adolescent development within a timeframe of over twenty years. We could reveal that not only adolescent self-esteem level but also self-esteem change plays a crucial role in the prevention of depressive symptoms still two decades later. These results provide a basis for interventions in enhancing self-esteem during adolescence – thus, during an age period when self-esteem is especially malleable.

3.2 STUDY 2: ADOLESCENT EMPATHY LEVEL AND CHANGE AS PREDICTORS OF SOCIAL OUTCOMES IN ADULTHOOD[7]

3.2.1 THEORETICAL BACKGROUND

Empathy is the ability to share and understand others' thoughts and feelings (Eisenberg & Fabes, 1990; Hoffman, 2000). This ability is important to promoting positive behaviors toward others and facilitating social interactions and congenial relationships (McDonald & Messinger, 2011). Previous research suggests positive associations between prosocial tendencies and both situationally induced and dispositional empathy-related responses. For example, adolescents who report higher empathy also report more prosocial goals, are socially more competent, are less aggressive, have more supportive peer relationships, are well liked by their peers, and are more likely to help others (Eisenberg, Morris, McDaniel, & Spinrad, 2009). Moreover, adult empathy has been linked to a wide array of prosocial correlates. For example, adults who report higher empathy are more willing to volunteer (Davis et al., 1999), donate more to charity (Wilhelm & Bekkers, 2010), and are more grateful to others (McCullough, Emmons, & Tsang, 2002). Empathy also appears to enhance forgiveness in individuals (McCullough, Worthington, & Rachal, 1997) and couples (Paleari, Regalia, & Fincham, 2005). It is then unsurprising that higher empathy enables individuals to relate to others in a way that promotes cooperative, prosocial, and satisfying relationships rather than conflicted, antisocial, and unpleasant interactions with others. However, it is unclear whether *change* in empathy may have long-term consequences on social outcome variables over and above the empathy level. Thus, this study

[7] This is the pre-peer reviewed version of the following article which has been published in final form in the *Journal of Personality*:

Allemand, M., Steiger, A. E., & Fend, H. A. (2014). Empathy development in adolescence predicts social competencies in adulthood. *Journal of Personality.* DOI: 10.1111/jopy.12098

examined the predictive influence of empathy development in adolescence on social competencies and outcomes in adulthood, well beyond the adolescent years.

3.2.1.1 EMPATHY DEVELOPMENT IN ADOLESCENCE

Evidence for empathy as a developmental construct comes from intervention studies and developmental studies. First, empathy can be experimentally manipulated or changed with teaching and practice over relatively short periods of time. For example, studies have shown that empathy trainings increase the ability to empathize in children (Greenberg, Kusche, Cook, & Quamma, 1995) and delinquent youth (Gibbs, Potter, Barriga, & Liau, 1996). Empathy trainings also increased prosocial behaviors in adults (Leiberg, Klimecki, & Singer, 2011). Second, there is emerging evidence for normative changes in empathy over longer periods of time. Research demonstrates that empathy-related abilities emerge in the early years of life and develop in more complex forms in childhood and adolescence (Eisenberg, Spinrad, & Morris, 2013; McDonald & Messinger, 2011). Empathy changes were also evidenced in emerging adulthood (Eisenberg et al., 2002; Konrath, O'Brien, & Hsing, 2011), and from early adulthood to old age (O'Brien, Konrath, Grühn, & Hagen, 2013). Moreover, research demonstrates individual differences in the degree and direction of empathy development (Grühn, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008).

Although the literature supports the claim that empathy is malleable across the entire lifespan, adolescence is an important developmental period that seems particularly essential for empathy development for several reasons. Adolescence has traditionally been conceived as a transitional period, characterized by a number of physical and physiological changes in such characteristics as height, weight, body proportions, and hormones, combined with individual,

social, and contextual transitions (Blakemore & Mills, 2014; Steinberg & Morris, 2001; Zarrett & Eccles, 2006). Many of these changes and challenges have important implications for empathy development. For example, improvements in abstract thinking and increased memory capacity in tandem with socio-emotional changes such as increased emotion regulation abilities promote prosocial tendencies and empathy (Eisenberg, Fabes, & Spinrad, 2006). Changes in moral reasoning are also important with respect to empathy development. Adolescents increasingly develop internalized abstract moral and social principles that promote prosocial and responsible behaviors, and they have more opportunities to help others by means of volunteering activities (Eisenberg et al., 2006; Hoffman, 2000). Finally, normative changes in social relationships with peers and adults in tandem with increases in autonomy with respect to social behaviors and values provide opportunities to show prosocial behaviors such as empathy-related responding (Zarrett & Eccles, 2006). Furthermore, adolescents are often given more autonomy by their teachers and parents in order to let them gradually grow into adult societal roles (Steinberg, 2008). These tasks let adolescents take over responsibility for their own actions and in turn, might promote responsible and prosocial behavior. Based on these theoretical assumptions there is good reason to expect continued increase in empathy across the adolescent years.

The literature on empathy development from age 12 to 16, however, is limited and empirical findings are inconsistent. There is evidence for normative increases in prosocial tendencies and behaviors from childhood to adolescence (Eisenberg & Fabes, 1998), although not from early (age 13 to 15) to later (age 16 to 18) adolescence (Fabes, Carlo, Kumpanoff, & Laible, 1999). Moreover, the evidenced age trends were dependent on the study design (e.g., correlational, experimental studies), the method of assessment (e.g., self-report, other-report, observation) and the target of prosocial behavior (e.g., peers or adults) (Eisenberg & Fabes,

1998). For example, prosocial behaviors such as sharing or donating were more pronounced in adolescents compared to children aged 7 to 12 years, but not with respect to instrumental helping or comforting. Some findings indicated that prosocial behavior directed toward adults did not change in adolescence (cf. Eisenberg & Fabes, 1998). Other studies reported decreases in prosocial tendencies from early to middle adolescence (Carlo, Crockett, Randall, & Roesch, 2007), and slight increases in late adolescence and early adulthood (Eisenberg, Cumberland, Guthrie, Murphy, & Shepard, 2005). A recent longitudinal study of adolescents aged 13 at the first assessment found that self-reported prosocial behaviors (i.e., sharing, helping, and caring) decreased until late adolescence and then slightly rebound after age 21 (Kanacri, Pastorelli, Eisenberg, Zuffiano, & Caprara, 2013). In contrast, there is also some evidence for a modest positive age trend in empathy across the adolescent years, with older adolescents being more empathic than younger adolescents (cf. Eisenberg et al., 2009).

Even less is known about individual differences in the degree and direction of empathy development during the adolescent years, as adolescents may differ in their management of the manifold changes related to adolescence (Zarrett & Eccles, 2006). Whereas some adolescents successfully manage these challenges, other adolescents find the transition to adulthood more difficult. Such differences might lead to significant individual differences in empathy development. Accordingly, it becomes a question for research whether these individual differences in change are related to adult outcomes.

3.2.1.2 LONG-TERM CONSEQUENCES OF ADOLESCENT EMPATHY DEVELOPMENT

Adolescence represents a unique window into developmental changes that might have long-term consequences for the individual well beyond the adolescent years. As such, it has

often been described as a time of heightened vulnerability for the onset of later adaptation problems in social and emotional domains (Steinberg, 2005). Most adolescents have the personal, emotional, and social resources to successfully explore and interact with the manifold challenges of this period. However, some adolescents have not and engage in unhealthy and risky behaviors such as drug abuse, unsafe sex, school underachievement, and delinquency. These behaviors might have long-term consequences for the individual such as motherhood or fatherhood as a result of teenage pregnancy or lower educational attainment in adulthood due to underachievement at school and learning difficulties (cf. Lerner & Galambos, 1998).

The adolescent years also provide opportunities to develop and exercise social competencies and skills, attitudes, and social values that are necessary to make a successful transition into adulthood and that will help to become caring and responsible adults (Erikson, 1968; Zarrett & Eccles, 2006). The adults that emerge from adolescence must be equipped with skills to navigate the social complexities of adult life. During this time period, adolescents typically experience shifts in their relationship to parents from dependency to autonomy and increasing responsibilities in the family and community. For example, the opinions of peers become more important than those of family members (Larson, Richards, Moneta, Holmbeck, & Duckett, 1996). Adolescents are also exposed to novel social situations and they explore new social roles and experience first intimate partnerships. As such, adolescence might represent a period of enhanced sensitivity for social experiences in the environment that might motivate certain behaviors such as empathy-related responding (Blakemore & Mills, 2014). Indeed, the ability to share and understand others' thoughts and feelings is particularly important in this respect, as it facilitates positive social interactions with others and effective understanding and communications (McDonald & Messinger, 2011). Social relationships provide excellent opportunities to practice and display prosocial skills and competencies such as empathy and

thus to receive constructive feedback from others. Such reciprocal processes may then promote social competencies and help to build long-lasting social resources. Therefore, the acquisition of skills, attitudes, and values needed to make a successful transition into adulthood including partnership, parenting, work and citizenship are important challenges in adolescence. In particular, empathy might positively affect future social relationships, including romantic relationships. Imagining others' thoughts and feelings promotes behaviors that are adaptive in social relationships such as sharing, caring, helping, and active listening (e.g., Caprara, Alessandri, & Eisenberg, 2012; Eisenberg & Fabes, 1990; Graziano, Habashi, Sheese, & Tobin, 2007). Taken together, the development of empathy in adolescence is important in building up (unsupervised) outerfamilial peer relationships, maintaining good interaction with one's family, or at the workplace because it helps building meaningful relationships, maintaining friendships, and developing strong communities.

Despite the social benefits of empathy, very high levels or very low levels of empathy can be costly (e.g., Hodges & Diener-Biswas, 2007; Hoffman, 2000). For example, high empathy might lead to empathic distress, as sharing and understanding other's concerns and negativity is consuming on the emotional level. Empathic distress then may result in an egoistic motivation to reduce this distress (e.g., by avoiding the stressor) and thus decrease the capacity to be of assistance to others and to show prosocial behaviors (Decety & Lamm, 2009). Low empathy might have adverse effects as well, as they make social interactions and relationships more difficult. Research has consistently demonstrated that those individuals who score low in empathy tend to show more aggressive and violent behaviors, bullying, and more conflicts with others (e.g., Gini, Albiero, Benelli, & Altoè, 2007; Jolliffe & Farrington, 2004). Individuals with low empathy cannot imagine the potential harm and consequences that they might cause. As such, low empathy is related to antisocial behaviors.

In addition, it has been suggested that the adolescent years are particularly formative years for moral personality development that continues across the lifespan (Hill & Roberts, 2010), and that empathy plays an important role in moral behavior and development (Hoffman, 2000; Tangney, Stuewig, & Mashek, 2007). As research demonstrates associations between empathy-related responses and morally relevant behaviors such as helping behaviors (e.g., Eisenberg et al., 2009), changes in empathy would have clear ramification for moral behavior and possibly for what individuals view as moral or not. For example, it is during adolescence that individuals are beginning to engage in adult-like activities such as community service. These activities reflect adult society. Engagement in such activities and behaviors provides meaningful opportunities for adolescents to explore their identity and potential social roles in society (Youniss, McLellan, Su, & Yates, 1999). The ability to understand others' thoughts and feelings is particularly important in the engagement of social activities and roles, as it includes an explicit focus on others. This idea is related to the social investment theory suggesting that greater investment in social roles should promote adaptive personality development (e.g., increases in agreeableness, conscientiousness, and emotional stability; Roberts & Wood, 2006). In turn, individuals with an adaptive personality profile are better suited for engagement in society (Lodi-Smith & Roberts, 2007).

In summary, theory suggests that empathy contributes to positive social interactions and socially skilled behavior. However, it is unclear whether adolescent empathy development has consequences for social adjustment beyond the adolescent years. So far no study has investigated whether individual differences in empathy development in adolescence have long-term social consequences in adulthood.

3.2.2 RESEARCH QUESTIONS AND AIMS OF THE STUDY

This study examined the predictive influence of adolescent empathy development on social outcome variables in adulthood in a 23-year study. We had four specific goals, whereby the first goal reflected a prerequisite for the other goals. The first goal was to establish longitudinal measurement invariance of the empathy measure to ensure that the construct is comparable across measurement occasions (Meredith & Horn, 2001). Frequently, in developmental studies it is implicitly assumed that the measurement process of constructs is similar over time. But changes can only be unambiguously interpreted as a reflection of a developmental process when items of a questionnaire do not change connotation or contribution to the construct over time. Therefore, establishing measurement invariance is an essential prerequisite for the study of constructs over time (e.g., Allemand, Zimprich, & Hertzog, 2007; Meredith & Horn, 2001).

The second goal was to examine empathy development across the adolescent years by means of latent growth models (e.g., Bollen & Curran, 2006). Based on previous findings (Eisenberg & Fabes, 1998; Eisenberg et al., 2009), we expected an average positive age trend in empathy during adolescence. More importantly, we expected individual differences in the degree and direction of empathy development, as individuals may begin at different initial levels and show different developmental trajectories and/or rates of change.

The third goal was to examine whether gender explains individual differences in empathy development. Due to social expectations and gender stereotypes, it is possible that girls are more encouraged to develop empathic skills, and display greater empathy than boys (e.g., Kite, Deaux, & Haines, 2008). Indeed, it appears that in adolescence, girls view themselves as being more prosocial and empathic, and also engage in more prosocial and caring behaviors than do boys (e.g., Eisenberg & Fabes, 1998). Therefore, we expected gender differences in empathy development, favoring girls over boys.

The fourth goal of this study was to explore whether individual differences in empathy development in adolescence are related to self-reported *social competencies* (adult empathy, communication skills) and social outcomes in adulthood (perceived social integration, relationship satisfaction, conflicts in relationships). Social competencies reflect relatively enduring tendencies to react in social competent ways to others. As such, we expected that adolescent empathy would be modestly related to adult empathy, as the ability to empathize with others during the adolescent years may be an important contributor of social competencies in adulthood. We also expected that adolescent empathy is relevant for basic communication skills in relationships such as active listening or self-reflection, as good communication skills typically require the ability to share and understand others' perspectives. Support for the assumption that adolescent empathy is related to adult social competencies comes from research demonstrating that personality traits observed in childhood and adolescence predicts adult behaviors and outcomes (Nave, Sherman, Funder, Hampson, & Goldberg, 2011; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). Besides the empathy level in adolescence, we also considered change in empathy as an important predictor of social competencies, as adolescence is a time of „reorganization" and a time period to experiment with new social roles and experiences that allow and foster the development of empathy (e.g., Steinberg, 2005). Therefore, independent of initial empathy level, change in empathy should be related to these social competencies in adulthood.

We also explored whether adolescent empathy is related to *social outcomes* in adulthood, and for these outcomes, we expected modest long-term associations at most. The first social outcome refers to positive social perceptions in adulthood such as being socially integrated in a group of friends. One reason for this assumption is that the capacity to share and understand others' thoughts and feelings might help to achieve better social relationships and integration

in social networks. In addition, we examined potential long-term effects of empathy development on relational aspects such as relationship satisfaction and perception of conflicts in relationships. We investigated this association, as the ability to empathize is important for relationship quality, in part, by facilitating the maintenance of meaningful social relationships (McDonald & Messinger, 2011). Indeed, research suggests that empathy is a key component of relationship satisfaction and success (Cramer & Jowett, 2010) and is related to high levels of conflict resolution skills in adolescents and adults (de Wied, Branje, & Meeus, 2007; Paleari et al., 2005).

In summary, the aim of this study was to examine individual differences in adolescent empathy development, and to demonstrate that not only empathy *level* predicts social outcomes but that also *change* in empathy during the adolescent years has positive long-term social consequences in adulthood. The novel contribution of this study is the focus on the predictive influence of empathy level and, particularly, change in *adolescence* on self-reported social competencies and outcomes in *adulthood*, the use of a large and unique data set containing data covering the adolescent years from ages 12 to 16 years with frequent (i.e., yearly) measurements, and the inclusion of important social variables with the age of 35 years and thus covering a long time span.

3.2.3 METHODS

3.2.3.1 PARTICIPANTS AND PROCEDURE

Data come from the German LifE-Study ("Pathways from Late Childhood to Adulthood"; Fend, Georg, Berger, Grob, & Lauterbach, 2002). Adolescents (N = 2,054) were assessed five times during adolescence at the age of 12 years (T1: 1979), 13 years (T2: 1980; N = 2,047), 14

years (T3: 1981; *N* = 2,003), 15 years (T4: 1982; *N* = 1,952), and 16 years (T5: 1983; *N* = 1,790). A follow-up assessment was conducted in adulthood when participants were 35 years old (T6: 2002). From the initial study participants, 74% (*N* = 1,527; 48.3% female) participated at T6 as adults. For this study we focused on these 1,527 participants because we were interested in linking variables in adolescence with variables in adulthood.

With respect to educational attainment, 4.5% participants reported to have no further education after the compulsory school years (primary and secondary school: 9 years in total), 50.1% reported to have completed an apprenticeship after school, 22.5% reported to have completed a technical or professional school and 22.1% have a college degree or degree university degree. Regarding marital status, 59.2% were married, 32.8% were single, and 7.9% were either divorced or widowed. Of the study participants, 85.2% reported being in an actual romantic relationship at the age of 35 years (T6).

The adolescent participants represented the full range of socio-economic status in the general West Germany population, were mainly of German origin and are close to representative of the Western German population (see Fend, Berger, & Grob, 2009, for details). In the follow-up measurement two decades later (T6), some differences between the remaining adult sample and the youth sample emerged. For instance, a smaller number of participants originated from lower socio-economic status, from metropolitan regions and lower educational background compared to a representative German population survey conducted in the same year (Fend et al., 2009). Moreover, attrition analysis showed that individuals who participated in the follow-up study at age 35 did not significantly differ in their level of empathy at T1 from those individuals who dropped out of the study.

3.2.3.2 MEASURES IN ADOLESCENCE

Empathy. Empathy was measured in adolescence (T1 to T5) with eight items (Briechle & Fend, 1986). Example items were "When my friend is nervous, I can immediately feel that," "When my friend is afraid of a school test, I immediately note that before he or she even tells me," and "I can easily feel if my parents worry about my school grades, even if they don't say anything". Participants rated each item on a dichotomous scale (1 = *rather disagree*, 2 = *rather agree*). The items were summed to create a sum score (potential range: 8 to 16). The reliability estimates for the dichotomous measure ranged between .67 and .73 for the five measurement occasions.

3.2.3.3 MEASURES IN ADULTHOOD

Empathy. Three items were used to assess participants' perception of their empathy ability at T6. These items originated from a scale on individual relationship competencies (Vierzigmann, 1995). The items were "When somebody is sad or upset, I find it easy to find the right words," "I find it difficult to understand other people's feelings" and "In general, I have a good sense for how others feel". Participants were asked to indicate on a six-point scale (1 = *does not apply at all* to 6 = *applies fully*) how they perceive their empathic ability. The alpha reliability estimate for the three-item scale was .71.

Communication skills. Five items were used to measure communication skills in relationships (i.e., active listening, I-messages, joint solution, meta-communication, and self-reflection) that are important in conflict situations (Fend et al., 2002). Example items were "It is important to me to precisely understand what my partner wants to say," "I try to find a solution which is also acceptable to my partner," and "We talk about how we interact with each

other". Participants indicated on a six-point scale (1 = *never* to 6 = *always*) how they typically respond to conflict situations in their marriage or relationship. The alpha reliability estimate was .85.

Social integration. Three items were used to measure adults' perception of their social integration. Items originated from the family survey of the German Youth Institute (Bien, Bender, Mittag, & Brislinger, 2000). The items were "I often feel lonely," "I think, the circle of my friends is too small" and "I miss companionability with people". Participants were asked to indicate on a six-point scale (1 = *does not apply at all* to 6 = *applies fully*) if they perceived themselves as isolated or well integrated in a group of friends. The items were reverse coded, so that higher scores reflect higher standing on the construct. The alpha reliability estimate was .79.

Relationship satisfaction. This scale included six items on relationship satisfaction indicating appreciation and intimacy in romantic relationships (Furman & Buhrmester, 1985). Example items were "In our relationship, I can tell my partner everything that worries me," "I feel I'm really important to my partner" or "My partner likes me the way I am". Participants indicated on a six-point-scale (1 = *never* to 6 = *always*) how often these statements were true for them. The alpha reliability estimate was .86.

Conflicts in relationships. Three items were used to measure conflict in adult romantic relationships based on Schneewind and Ruppert (1992). The items were "In our marriage/relationship there are tensions and fights," "In our marriage/relationship small things end up in big fights" and "In our marriage/relationship we have loud and heavy fights". The participants could answer on a six-point scale (1 = *never* to 6 = *always*) how they perceived conflict frequency in their marriage or relationship. The alpha reliability estimate was .83.

3.2.3.4 STATISTICAL ANALYSES

We performed the analyses in four steps. First, we tested longitudinal measurement invariance (MI) of the empathy measure to examine whether the measure behaves equivalently across the five measurement occasions in adolescence (T1 to T5). In practice, longitudinal MI includes fitting confirmatory factor models with increasingly severe restrictions on three measurement parameters over time: factor loadings, intercepts/thresholds (continuous/categorical variables), and residual variances (e.g., Meredith & Horn, 2001; Widaman Ferrer, & Conger, 2010). The measurement model consisted of five correlated latent empathy factors (T1 to T5) with eight manifest indicators (items) per measurement occasion. Because data in this study were categorical, we used models for categorical variables and estimated thresholds between categories (Millsap & Yun-Tein, 2004). The number of thresholds is equal to the number of categories minus one, resulting in one threshold to be estimated.

The steps of invariance testing with categorical variables differ from the more familiar case of invariance testing with continuous variables (Muthén & Muthén, 2010). The invariance testing comprises three steps (Schroeders & Wilhelm, 2011, p. 860). For the least restrictive model (configural invariance), manifest indicators (items) are constrained to load on the same factor across time. Next, factor loadings and thresholds are constrained to be equal across time in tandem (strong invariance). Assessing invariance with categorical variables requires constraining factor loadings and thresholds in tandem because item characteristic curves are based on both parameters (Muthén & Muthén, 2010, p. 433). Finally, for the most restrictive model (strict invariance), all parameters are constrained to be equal across time with residual variances being fixed at 1 across time (Schroeders & Wilhelm, 2011). To scale the latent

variables, the factor loading for the first item of the empathy measure was fixed at 1. Moreover, we specified correlated residual variances over time.

Second, after establishing longitudinal MI, we estimated second-order latent growth models with eight manifest indicators (items) per measurement occasion (e.g., Duncan, Duncan, & Strycker, 2006; Geiser, Keller, & Lockhart, 2013) to examine empathy across the five measurement occasions. These models were used instead of standard first-order latent growth models based on a single manifest indicator variable per measurement occasion because unreliability of the manifest variables can lead to an underestimation of change. For all five lower-order factors (latent empathy at T1 to T5), the means (intercepts) were fixed at 0 across all measurement occasions. For the higher-order models, we specified one intercept factor and one slope (change) factor. We tested three different models: First we tested an intercept-only-model (baseline model). Next, we estimated linear and non-linear growth models to test the shape of empathy development by specifying an intercept factor and one slope/shape factor. Because time intervals were one year, slope factor loadings were fixed to 0, 1, 2, 3, and 4, corresponding to linear growth. The non-linear growth model was specified as suggested by Meredith and Tisak (1990). The first shape factor loading was fixed to 0 to estimate the intercept, the second loading was fixed to 1 to identify the metric of the slope factor, but the third through fifth loadings were freely estimated. In addition to average estimates of intercept and slope/shape, we were particularly interested in individual differences in empathy intercept and slope/shape. Significant variance in intercept would indicate that individuals differ in their initial level of empathy, whereas significant variance in empathy slope/shape would suggest that adolescents differ in their empathy development.

Third, we included gender as time-invariant covariate to examine whether empathy intercept and slope in adolescence vary as a function of gender.

Fourth, we investigated the predictive influence of empathy development in adolescence on self-reported social outcome variables in adulthood using adolescent empathy intercept and slope as predictors of adult outcome variables. Each outcome variable was predicted separately by empathy intercept and slope. We controlled for possible gender effects in these analyses. We modeled the outcome variables as latent constructs using items of the outcome variables as manifest indicators.

All analyses were performed with Mplus 6 (Muthén & Muthén, 2010), accounting for the presence of missing data by the full information maximum likelihood (FIML) algorithm. We used the theta parameterization and the robust weighted least squares mean adjusted (WLSM) estimator for our analyses and report the mean adjusted chi-square (adj. χ^2). As criteria for model fit, we report the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). Values of the CFI above .95 and values of the RMSEA below .06 reflect a well-fitting model (Hu & Bentler, 1999). In comparing the relative fit of nested models, we used the Satorra-Bentler adjusted chi-square difference test (S-B$\Delta\chi^2$) (Satorra & Bentler, 2001). Due to its dependency on sample size, we complemented the chi-square difference test by calculating 90% RMSEA confidence intervals (CIs) for the models estimated (MacCallum, Browne, & Sugawara, 1996). Since the RMSEA is virtually independent of sample size, the comparison of RMSEA CIs provides an effective, alternative method of assessing relative model fit of nested models. Moreover, a change in the CFI of less than .01 amounts to a trivial difference in model fit (Cheung & Rensvold, 1999).

3.2.4 RESULTS

Table 5 presents descriptive statistics and zero-order correlations among the study variables. To establish longitudinal measurement invariance, we first started with the least restrictive model (Model 1: configural invariance) that constrains manifest indicators (items) to load on the same factor across time. As can be seen from Table 2, this model did achieve a good model fit as judged by CFI and RMSEA. Second, factor loadings and thresholds were constrained to be equal over time (Model 2: strong invariance; see Muthén & Muthén, 2010, p. 433). This more restrictive model also achieved an acceptable model fit (Table 2). In comparison to Model 1, the Satorra-Bentler adjusted chi-square difference was statistically significant. However, as indexed by the overlap of the RMSEA 90% CIs, there was no difference in fit. Likewise, the change in the CFI of .003 reflects a trivial difference in model fit. From these results, one might conclude that strong invariance holds over time with respect to empathy. Finally, in the most restrictive model all measurement parameters are constrained to be equal across time with residual variances are fixed at 1 across time (Model 3: strict invariance). This model represented the data adequately (Table 2). In comparison to Model 2, Model 3 did not represent a statistically significant reduction in model fit. This suggests that strict invariance did hold in this sample and adequately captured the data. In summary, the current results indicated that the measure of empathy behaved equivalently across the five measurement occasions in adolescence.

TABLE 5: DESCRIPTIVES AND CORRELATIONS OF VARIABLES OF STUDY 2

Descriptive Statistics and Correlations among the Study Variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Empathy age 12 (T1)	__	.42**	.38**	.32**	.30**	.12**	.10**	-.01	.05	.03
2. Empathy age 13 (T2)		__	.57**	.45**	.41**	.16**	.11**	.01	.01	.04
3. Empathy age 14 (T3)			__	.52**	.48**	.13**	.09**	.05	-.02	.05
4. Empathy age 15 (T4)				__	.53**	.17**	.14**	.02	.09**	-.01
5. Empathy age 16 (T5)					__	.17**	.13**	.06*	.09**	-.04
6. Empathy age 35 (T6)						__	.26**	.18**	.18**	-.09**
7. Communication skills age 35 (T6)							__	.15**	.53**	-.34**
8. Social integration age 35 (T6)								__	.28**	-.29**
9. Relationship satisfaction at age 35 (T6)									__	-.54**
10. Conflicts in relationship age 35 (T6)										__
Potential range	1-2	1-2	1-2	1-2	1-2	1-6	1-6	1-6	1-6	1-6
M	1.66	1.70	1.71	1.73	1.78	4.33	4.65	4.73	4.77	2.44
SD	0.27	0.26	0.25	0.26	0.23	0.73	0.84	1.03	0.77	0.72

Note. *$p < .05$, **$p < .01$.

3.2.4.1 EMPATHY DEVELOPMENT IN ADOLESCENCE

The latent year-to-year stability correlations based on Model 3 were .63 (age 12 to 13), .78 (age 13 to 14), .70 (age 14 to 15), and .71 (age 15 to 16), with all correlations being significant ($p < .01$). Figure 2 presents the mean-level estimates of empathy from Model 3 with the first measurement occasion (T1) as reference, that is, T2 to T5 are relatively scaled to T1. The results suggest that latent empathy increased from age 12 to 16.

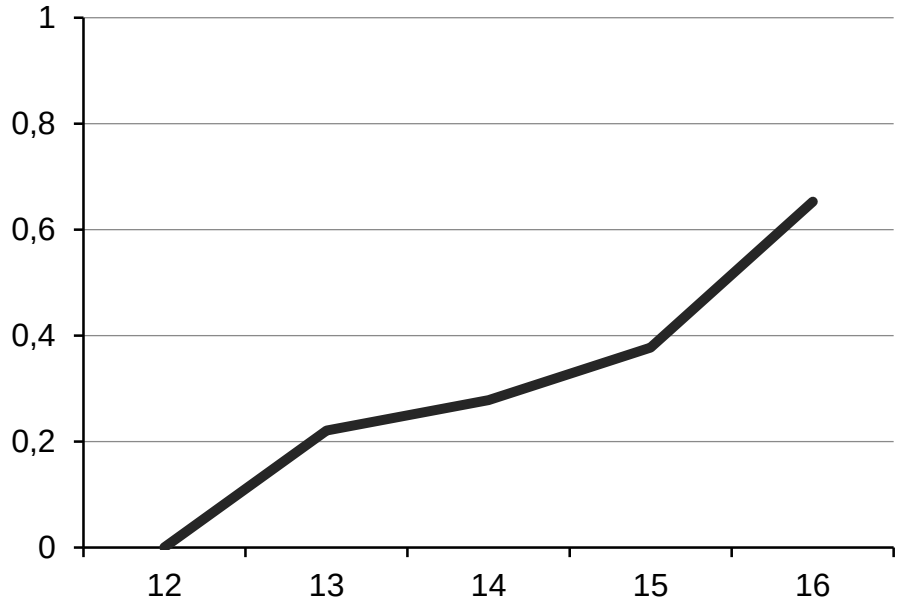


FIGURE 2

MEAN ESTIMATES OF EMPATHY FROM AGE 12 TO 16

Empathy development from age 12 to 16. Mean estimates are from the model of strict measurement invariance (M3). The initial measurement occasion at age 12 was used as a reference having a factor mean of zero, that is, factors means from age 13 to 16 reflect deviations from the reference.

To examine empathy development across the adolescent years more precisely, we estimated three second-order latent growth models based on the model of strict invariance (Model 3). Table 6 presents the model fits of the intercept-only-model or baseline model (Model 4), the linear growth model (Model 5), and the non-linear growth model (Model 6). All three models achieved acceptable fits. However, the linear model and the non-linear model represent the data better than the intercept only model (Table 6). The comparison between the linear and non-linear models suggests that both models are equal in terms of model fit (Table 6). Also, as indexed by the overlap of the RMSEA 90% CIs, there was no difference in fit. As the model fits of the linear and non-linear growth model are equal, we decided to report the findings for the linear model.

The unstandardized mean estimates for the linear growth model were: intercept (M = 0.28, p < .01, SE = 0.03) and slope (M = 0.09, p < .01, SE = 0.01). The intercept did not significantly covary with the slope (Cov = -0.01, SE = 0.01). Moreover, we found significant variances in intercept (Var = 0.20, p < .01, SE = 0.03) and slope (Var = 0.01, p < .01, SE = 0.003), suggesting individual differences in level and change of adolescent empathy. In summary, the average trend suggests an increase in empathy across the adolescent years. Moreover, individuals differed in their initial level and change in empathy.

Next, we included gender (0 = female, 1 = male) as time-invariant covariate in the linear model to examine whether empathy level and change vary as a function of gender (Model 7 in Table 2). The results indicate that gender was significantly related to the intercept of adolescent empathy (unstandardized estimate: B = -0.23, p < .01, SE = 0.04) but not to the slope (unstandardized estimate: B = -0.02, p > .10, SE = 0.01). In summary, girls had higher initial level of empathy as compared to boys but they did not develop differently across the adolescent years with respect to empathy.

Significant gender differences were evidenced for the social competencies but not for the social outcomes. Women (*M* = 4.49, *SD* = 0.69) were more empathic than men (*M* = 4.17, *SD* = 0.73, *d* = 0.45) and they tended to have higher levels in communication skills (*M* = 4.72, *SD* = 0.82) compared to men (*M* = 4.58, *SD* = 0.86, *d* = 0.17).

3.2.4.2 PREDICTION OF ADULT SOCIAL COMPETENCIES AND OUTCOMES

To examine the predictive influence of empathy development on social variables in adulthood we estimated models that include empathy intercept and slope as predictors of one of the five adult variables. Gender was controlled in all analyses. The models showed acceptable fits (adj. χ^2's = 1149.19 to 1475.44, *df*'s = 874 to 1006, *p*'s < .01; CFI's = .989 to .983, RMSEA's = .014 to .017).

Table 7 presents the findings of these models. The results demonstrate that empathy level in adolescence is related to individual differences in social competencies (empathy and communication skills) at the age of 35 years. Being more empathic in adolescence predicted higher empathy in adulthood as well as better self-reported communication skills in relationships. In addition, not only empathy intercept was related to social variables in adulthood but also change in empathy. More specifically, empathy slope predicted a higher standing on empathy, communication skills (marginally significant), and perceived social integration at the age of 35 years (Table 7). In other words, those participants who increased in empathy across the adolescent years perceived themselves as being more empathic and socially integrated in adulthood compared to those who decreased in empathy during adolescence. They also tended to report higher levels of communication skills that are important in conflict

situations. In summary, not only level but also changes in adolescent empathy predicted individual differences in social competencies in adulthood two decades later.

TABLE 6: MODEL ESTIMATES OF LATENT GROWTH CURVE MODELS OF STUDY 2

Longitudinal Measurement Invariance Models and Latent Growth Models

Model	adj. χ^2	*df*	SC	CFI	RMSEA (90% CI)	S-B$\Delta\chi^2$	Δdf	ΔModels
M1: Configural invariance	658.18	650	0.773	1.000	.003 (.000; .009)	--	--	--
M2: Strong invariance	736.23	674	0.789	.997	.008 (.001; .011)	59.00*	24	2-1
M3: Strict invariance	733.72	706	0.861	.999	.005 (.000; .010)	21.39	32	3-2
M4: Intercept only	1328.48**	719	0.910	.974	.024 (.022; .026)	--	--	--
M5: Linear growth	803.20*	716	0.893	.996	.009 (.005; .012)	98.98**	3	4-5
M6: Non-linear growth[a]	788.96*	713	0.885	.997	.008 (.003; .012)	6.81	3	5-6
M7: Linear growth plus gender	1018.27**	754	0.894	.988	.015 (.013; .018)	--	--	--

Note. M1 to M3: longitudinal measurement invariance models, M4 to M6: latent growth models, M7: latent growth model including gender as time-invariant covariate; [a]the non-linear model was specified according to the suggestions by Meredith and Tisak (1990); adjusted χ^2: mean-adjusted chi-square test statistics (WLSM estimator), SC: scaling correction factor, CFI: comparative fit index, RMSEA: root mean square error of approximation; 90% CI: 90% confidence intervals for RMSEA, S-B $\Delta\chi^2$: Satorra-Bentler scaled [S-B] chi-square difference, ΔModels: comparison of models. *$p < .05$; **$p < .01$.

TABLE 7: COEFFICIENTS OF PREDICTORS OF LATENT GROWTH CURVE MODELS OF STUDY 2

Level and Linear Change of Empathy as Predictors of Adult Social Outcomes

Outcomes in adulthood	Intercept as predictor			Slope as predictor		
	Standardized coefficient	Unstandardized coefficient	*SE*	Standardized coefficient	Unstandardized coefficient	*SE*
Empathy	0.23**	0.31	0.07	0.14*	0.77	0.35
Communication skills	0.18**	0.29	0.08	0.12$^{\#}$	0.76	0.45
Social integration	0.01	0.02	0.09	0.13*	1.05	0.56
Relationship satisfaction	0.05	0.08	0.07	0.11	0.72	0.44
Conflicts in relationship	0.05	0.06	0.06	-0.10	-0.55	0.37

Note. Controlled for gender effects; SE: standard error. $^{\#}p < .09$, $*p < .05$, $**p < .01$.

3.2.5 DISCUSSION

Adolescence is a key period in the lifespan for individuals to develop and exercise social skills and competencies that will help them to become caring and responsible adults. What may be most fascinating about the present results is that the ability to share and understand others' thoughts and feelings and its development during adolescence matter for individual differences in self-reported social competencies still decades later in adulthood. For this study we pursued four goals. As a first goal, we examined longitudinal measurement invariance of the measure of adolescent empathy that has a dichotomous response format. This issue has received less attention in previous empathy development research but is more prominent in personality development research (e.g., Allemand et al., 2007; Zimprich, Allemand, & Lachman, 2012). In this study we demonstrated strict invariance of the empathy measure over time, which warranted unbiasedness of the empathy measure across measurement occasions. Put differently, the measure behaved equivalently across the five measurement occasions in adolescence.

As a second goal, we examined empathy development across the adolescent years. On the one hand, we found relatively high levels of stability in empathy with respect to the year-to-year stability correlations. This implies high persistence of individual differences over time. Although most adolescents tended to maintain their relative standing on empathy relative to others over time, this does not imply that there are no reliable individual differences in empathy change. Note that stability was modeled on the latent level, that is, estimates were uncontaminated by measurement error. In this case, stability coefficients less than 1 necessarily entail individual differences in change.

On the other hand, we found a modest increase in empathy at the mean-level, implying that adolescents tended to linearly increase in empathy as they moved through the adolescent years.

This result confirms our expectation and some previous findings (e.g., Eisenberg et al., 2009). Note, however, that in the present study we modeled empathy on the latent level and based on strict measurement equivalence. The positive age trend in empathy might reflect maturation processes consistent with the notion that adolescents increasingly develop and internalize abstract moral and social principles that, in turn, promote prosocial and responsible behaviors (e.g., Eisenberg et al., 2006).

This result is similar to findings from the personality development literature suggesting that changes toward maturation in biological and psychosocial domains are reflected by changes in personality traits. More specifically, maturation in personality in adolescence typically involves personality changes toward an adult-like personality profile with increases in agreeableness, conscientiousness, extraversion, and openness, and a decrease in neuroticism (e.g., Caspi, Roberts, & Shiner, 2005; Klimstra, Hale, Raaijmakers, Branje, & Meeus, 2009). Agreeableness has been seen as a major determinant of prosociality (Caspi et al., 2005), as individuals with high scores on agreeableness are generally more concerned with others' well-being and report having more empathy (e.g., Caprara et al., 2012; Graziano et al., 2007). In addition, individual differences in the capacities for behavioral and cognitive control (Caspi et al., 2005) are also relevant for empathy-related responding, perhaps because high conscientiousness helps to inhibit antisocial behaviors and to promote well-controlled and responsible behavior. Along this line of reasoning, the developmental pattern of empathy found in our study might reflect a change toward maturation.

In addition to an average increase of empathy, we found clear evidence for individual differences in adolescent empathy development. As such, our findings contribute to the literature by showing that adolescents differed in their initial level of empathy, and despite the

average increase in empathy they differed in the degree and direction of their development. These results are consistent with the literature on personality development demonstrating significant individual differences in personality change during childhood and adolescence (e.g., De Fruyt et al., 2006; Pullman, Raudsepp, & Allik, 2006).

As a third goal, we examined whether gender explains individual differences in empathy development. The results demonstrated that gender was significantly related to the level of adolescent empathy favoring girls over boys, but it was not related to empathy change. This suggests that although boys and girls developed in a similar way across the adolescent years, girls tended to be generally higher on empathy. Likewise, female participants were also more empathic than male participants at the age of 35. These findings are consistent with commonly held stereotypes and popular culture suggesting that women have a greater capacity for understanding others' thoughts and feelings than do men (Kite et al., 2008). They also confirm findings of prior studies that consistently found that girls and women report higher empathy than boys and men (e.g., Batson et al., 1996; Eisenberg & Fabes, 1998).

As a fourth goal, we examined whether individual differences in empathy development in adolescence are related to self-reported social competencies and outcomes in adulthood. The results demonstrate that not only level but also change in adolescent empathy predicted individual differences in social competencies in adulthood. More specifically, the findings with respect to *level* of empathy as a predictor indicate that those adolescents high in empathy tended to be high in empathy as adults and use more constructive communication skills in conflict situations in their marriage or relationship. These findings are consistent with research findings demonstrating that individual differences in personality assessed in earlier periods of the lifespan have long-term effects on behaviors and outcomes later in life (e.g., Nave et al., 2011).

For example, a recent study demonstrated the significance of childhood personality for competence and resilience in early adulthood (Shiner & Masten, 2012). Big Five personality traits assessed at the age of 10 years were related to several measures of social competencies ten and 20 years later. Another study demonstrated that early childhood temperament predicts variation in political ideology at the age of 18 years (Fraley, Griffin, Belsky, & Roisman, 2012). Personality appears to be prospectively related to important life outcomes, such as health and longevity, marital success, and educational and occupational attainment (Roberts et al., 2007).

Moreover, the results with respect to *change* of empathy as a predictor indicate that individuals who increased in empathy during the adolescent years exhibited higher levels of empathy and perceived themselves as being well integrated in social networks two decades later in adulthood. An increase in empathy also appeared to be marginally related to better communication skills. Although the current predictive effects were generally small in size, it is important to remember that empathy development was related with variables two decades later, well beyond the adolescent years. These findings clearly underscore the notion that adolescence is an important developmental period in the lifespan with potential positive and negative implications for other age periods.

One of the unique aspects of this study was the focus on individual differences in *change* in empathy as a predictor of adult outcomes. Recent studies indicated that change in personality itself is an important predictor of life outcomes, such as substance abuse (Hampson, Tildesley, Andrews, Luckyx, & Mroczek, 2010), self-rated health (Turiano et al., 2012), mortality (Mroczek & Spiro, 2007), and depression (Steiger, Allemand, Robins, & Fend, 2014). Our study significantly contributes to this literature by showing that individual differences in

empathy change across the adolescent years matter still two decades later, at least for some self-reported social variables in adulthood.

Interestingly, empathy level in adolescence was not related to perceived social integration in adulthood, while the developmental process seemed to be important for these social perceptions. During adolescence individuals explore new social roles, build up less supervised peer friendships and initiate first romantic relationships (Steinberg & Morris, 2001; Zarrett & Eccles, 2006). Hence, an increase in empathy may play an important role in these new social contexts and influence the perception of social interactions and social networks in the long term. Indeed, our results demonstrated that those adolescents who increased in empathy tended to perceive themselves as being socially more integrated and having many good friends as adults. It is possible that increases in empathy might lead to better integration and interpersonal security in a variety of relationship experiences. By contrast, adolescents who decreased in empathy reported more loneliness and a smaller circle of friends as adults. Becoming less empathic during the adolescent years thus seems a risk factor for later social experiences such as loneliness. It is possible that a decrease in empathy thus leads to negative relationship experiences, which might be related to negative outcomes later in life. Indeed, a recent study demonstrated that an accumulation of adverse relationship experiences in youth is a risk factor for health outcomes in young adulthood such as poor general health and depressive symptoms (Adam et al., 2011).

The current results demonstrated that adolescent empathy level and change were not related to relationship functioning in adulthood. There are at least two possible explanations for these results. On the one hand, it is possible that distal factors such as adolescent empathy play a negligible role for adult relationship satisfaction, as proximal factors such as current intimacy,

stressful life circumstances, or poor coping processes might be more influential for relationship satisfaction and conflicts. On the other hand, the results of this study indicate that adult participants who view themselves as empathic also tended to be more satisfied with their relationship and reported lower levels of conflicts in relationships. As shown above, adolescent empathy predicted adult empathy. Therefore, the relationship between higher adult empathy and higher relationship satisfaction (and lower conflict levels) might be driven, at least in part, by positive empathy development and/or initial higher empathy level in adolescence. This interpretation would follow the idea that empathy is important for current relationship satisfaction (e.g., Cramer & Jowett, 2010), as it may promote adaptive processes following conflicts (McCullough et al., 1997; Paleari et al., 2005).

To the best of our knowledge, the current study is the first to examine long-term consequences of adolescent empathy development covering a time span of 23 years. Despite this unique longitudinal design, our work is not without limitations. First, it would be valuable to supplement the current work with other assessment methods. For instance, personality researchers have noted the importance of supplementing self-reports with observer-reports such as reports by parents or teachers (Vazire, 2006). Second, the constructs were assessed with short measures due to time and resources limitations typically associated with large-scale longitudinal studies (e.g., Lucas & Donnelan, 2011). It would be valuable to include longer measures in future studies. Third, the study design included frequent measurements in adolescence and only one measurement occasion in adulthood, and as such, it would be valuable to have more assessments in adulthood in order to chart the normative developmental patterns of empathy beyond the adolescent years (e.g., Eisenberg et al., 2002; Grühn et al., 2008). That

said, it would be valuable to include more measurement occasions in adulthood to examine the processes by which empathy influence diverse social competences and outcomes.

Finally, it is possible that some "third variables" underlie both the empathy development in adolescence and individual differences in social competencies in adulthood. One potential candidate is agreeableness. Agreeableness includes a variety of traits that promote positive behaviors towards others and facilitate congenial relationships with others (Graziano & Eisenberg, 1997). Agreeable individuals are more cooperative, considerate, empathic, generous, polite, and kind. As such, it is possible that adolescents high in agreeableness are the ones most likely to develop more strongly in empathy and to be more socially competent in adulthood. Future studies may examine whether and to what degree empathy and agreeableness develop in tandem. It would also be valuable to examine the joint predictive power of both constructs in future studies. Unfortunately, we were unable to test these ideas, as the Big Five personality traits were not measured in this study.

In conclusion, this study provides some of the first findings of long-term effects of empathy development during adolescence on social outcome variables in adulthood. It is clear from our results that, on average, adolescents increase in their ability to share and understand others' thoughts and feelings across the adolescent years. It is also clear from our findings that irrespective of the average developmental trend in empathy, adolescents significantly differ in their initial level as well as in their change over time. What may be most fascinating about the results is that these individual differences in developmental processes are influential at least for some aspects of the self-reported social functioning two decades later. As such, the current results are important because they show that it matters whether an adolescent increases or decreases in empathy across the transition period of adolescence. In other words, irrespective

of the initial empathy level, even small decreases in empathy during adolescence can be regarded as a risk factor for later social outcomes, whereas increases tend to reflect individual resources for the social functioning as an adult. The current results represent a challenge to future theorizing and research to provide a better understanding of how developmental processes in adolescence are predictive for adulthood.

3.4 STUDY 3: TESTING THE VULNERABILITY AND SCAR MODELS IN A LONG-TERM PERSPECTIVE AND ACROSS GENERATIONS[8]

3.4.1 THEORETICAL BACKGROUND

In the present study we tested the long-term longitudinal and intergenerational validity of the vulnerability and the scar models. Whereas the vulnerability model states that self-esteem is a relatively stable personality factor serving as a predictor of depressive symptoms (Beck, 1967, 1987; Orth & Robins, 2013), the scar model (Shahar & Davidson, 2003) states the opposite assuming that depressive episodes wound individuals (see Zeigler-Hill, 2011, for an overview of both models). According to the scar model, the depressive symptoms wear away one's self-esteem due to permanent scars originally caused by the depression. A number of longitudinal studies have extensively studied these competing models revealing strong support for the vulnerability model and weaker support for the scar model, as the former typically shows twice as large effect sizes compared to the latter (Orth & Robins, 2013; Sowislo & Orth, 2013).

Depressive symptoms are typically associated with serious consequences such as helpless behavior in social and achievement situations or physical disability (Bruce, Seeman, Merrill, & Blazer, 1994; Nolen-Hoeksema, Girgus, & Seligman, 1992) that can persist for years (Coryell, Scheftner, Keller, Endicott, Maser, & Klerman, 1993). Low self-esteem, on the other hand, is a valid predictor of a number of maladaptive life outcomes such as delinquency or lowered economic prospects (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005; Trzesniewski et al., 2006). Given the strong relation between low self-esteem and depressive symptoms and

[8] A similar version of this article is under review in *Developmental Psychology*:

Steiger, A. E., Fend, H. A., & Allemand, M. (under review). Testing the vulnerability and scar models of self-esteem and depression from adolescence to adulthood and across generations.

their negative effects on several important life outcomes, it is not surprising that they are extensively studied, particularly in the field of personality and clinical psychology (McCann & Sato, 2000), and that enhancing self-esteem and/or lowering depressive symptoms are central aims to many psychologists (Gortner, Rude, & Pennebaker, 2006; O'Mara, Marsh, Craven, & Debus, 2006; Robins, Trzesniewski, & Donnellan, 2012).

Despite considerable interest in this research domain, open questions remain. If low self-esteem and depressive symptoms are such clear predictors for the development of depressive symptoms or low feelings of self-worth, the question then arises (a) about their long-term validity across different developmental periods (i.e., from adolescence to middle adulthood), (b) whether they also reveal prospective power for related individuals (i.e., intergenerational effects) and (c) what factors might explain potential intergenerational effects. It is possible that the vulnerability and scar models can be applied more broadly, that is, the effects of low self-esteem and/or depressive symptoms might be carried *along across the lifespan* over decades and might even *spill over to the next generation*.

3.4.1.1 HOW LONG DO THE VULNERABILITY AND SCAR EFFECTS REMAIN POWERFUL?

Several explanations would suggest *long-term* vulnerability and scar effects. For example, life span development theorists suggest that human development is an open system that is both influenced by individuals as agents and co-construed by environmental, cultural and genetic conditions (Baltes, Staudinger, & Lindenberger, 2006; Pomerantz & Thompson, 2008). That is, individuals are born into a certain environment and culture with a set of genes but while the culture, the genes and the social circumstances certainly shape an individual's self, it is also the

individual who increasingly shapes the world around him or her while growing-up. Hence, situational factors, behavior and personality characteristics exhibit a mutually explanatory pattern placing the individual "on a life path that often becomes self-reinforcing" (Kern, Porta, & Friedman, 2013, p. 3). In line with this assumption, people typically show relatively stable behavioural patterns and characteristics over time resulting in more or less healthy lifestyles (Friedman, 2000; Kern et al., 2013). That is, individuals with low self-esteem may remain vulnerable to the development of depressive symptoms due to negative information processing patterns such as ruminating about own failures and losses (Kuster, Orth, & Meier, 2012) that may persist beyond adolescence. Furthermore, individuals with low self-esteem often show an increased sensitivity to rejection from relevant others (Joiner, Alfano, & Metalsky, 1992). If such a pattern is acquired during adolescence it might remain influential beyond the adolescent years.

Likewise, the scar effect might remain powerful across the lifespan because the experienced depressive symptoms might have weakened relevant social relationship (Orth, Robins, & Roberts, 2008) or one's thinking about the self which may be conveyed in sensitivity for negative as opposed to positive information about the self (Rohde, Lewinsohn, & Seeley, 1990). In summary, the vulnerability and scar effects may remain influential from adolescence to middle adulthood due to changes in information processing and/or behavioural patterns that mutually reinforce each other across the lifespan, leading to positive or negative developmental spirals.

3.4.1.2 DO THE VULNERABILITY AND SCAR EFFECTS REMAIN POWERFUL ACROSS GENERATIONS?

Several explanations exist for potential *intergenerational* vulnerability and scar effects. For example, from a sociocultural perspective, certain conditions in one generation are relevant for subsequent generations (Bengtson & Allen, 1993; Elder, 1994). According to the life course theory, each individual of a family is a member of a "shared history" (Bengtson & Allen, 1993). Members of the same group (e.g., family) might learn to interpret social, environmental, historical, or family related events in a similar way, as they share the same background and common knowledge. Thus, one could assume that individuals of the same family process self-related information in a similar way. For example, a mother who learned to respond to criticism fearfully and self-consciously might transmit that pattern of interpretation to her child. As a consequence, both members of this family might possess low self-esteem and thus might be more likely to develop depressive symptoms due to their unfavorable information-processing pattern (Abramson, Metalsky, & Alloy, 1989; Beck, 1987). Likewise, Thompson and Zuroff's (1998) showed that mothers high in self-criticism engage in more negative feedback with their children compared to mothers low in self-criticism. Similarly, self-critical styles of depressed parents seem to be transmitted to their children by means of the speech style these caregivers exhibit (Murray, Kempton, Woolgar, & Hooper, 1993).

Furthermore, from a learning perspective, children observe situations their parents encounter and the parental reactions typically applied to these situations. For example, it could be that a child observes his/her father reacting with anger and loud shouting to his wife when she criticizes him. Both the parental model of aggressive behaviour against others (Bandura, 1977), the home environment and the genetic disposition for aggression in parent and child

(Pomerantz & Thompson, 2008) might lead to similarities in a tendency toward anger reactions across generations.

Similar transmission mechanisms might be responsible for self-esteem and depressive symptoms. As noted above, G2 adolescents might have observed and adopted inferential styles and negative patterns of attending to and interpreting situations from their parents (who themselves acquired those psychological patterns during their adolescent years), making them more vulnerable to the development of depression (Abramson et al., 1989; Alloy, Lipman, & Abramson, 1992; Gibb et al., 2009; Pomerantz & Thompson, 2008). In other words, parents might model responses to challenges through their own positive or negative affect. If parents become anxious and frustrated in the face of a difficult situation they may convey to their offspring that abandoning such a situation or giving up is an adaptive way of coping, whereas parents showing positive affect might transmit to their children that the situation – although challenging – can be resolved (Thompson & Meyer, 2007).

In summary, the vulnerability effect might be effective over long-term periods and across generations. It is likely that G1 adolescents suffering from low self-esteem at a key developmental stage for self and identity development remain sensitive to the rejection from important others or excessively search for confirmation of one's worth as a person (Joiner, Alfano, & Metalsky, 1992) even when they become adults. As they move through different developmental stages, their self-esteem might be threatened at a certain point in time, resulting in depressive symptoms, which in turn, might impede the second generation's positive identity development during their vulnerable adolescent years (e.g., leading to negative perceptions of the future, a general discouragement). Thus, the hypothesized vulnerability effect across generations might be mediated by the adult's level of depressive symptoms. This assumption is

in line with longitudinal research showing that offspring of vulnerable mothers (low self-esteem and/or poor interpersonal functioning) have a fourfold higher rate of displaying psychological disorders compared to offspring of non-vulnerable mothers (Bifulco et al., 2002).

As for the hypothesized scar effect across generations, G1 adolescents might carry along the scars that originate from depressive symptoms in adolescence into their adult life. These scars may remain consequential for the next generation insofar as parents who once suffered from depressive symptoms might exhibit more insecurity, focus more on negative rather than positive information about the self and might exhibit less confidence in their every-day interaction with their children compared to parents who never made such adverse experiences (Whitbeck et al., 1992). It could be that parents with lower self-esteem might not be able to serve as valuable self-confident role-models for their growing-up children. More specifically, these parents are possibly more self-conscious in unpredictable and challenging situations making them less capable of transmitting positive, self-confident and assertive self-views in the next generation of adolescents, who themselves face difficult situations as they grow up. The hypothesized intergenerational scar effect would then be mediated via low self-esteem in G1 adults.

3.4.1.3 INTERGENERATIONAL CONTINUITY EFFECTS

The current study also examined intergenerational continuity effects of depression and self-esteem. Indeed, previous research evidenced continuity effects of depression across generations. For example, Hops (1996) found that depressive symptoms replicate across generations, especially in adolescence when the offspring starts to grow into adult roles. According to Hops (1996) and Davies and Windle (1997), girls are especially amenable to maternal influences due to their family-orientation and -dependency whereas boys are more peer-oriented and thus less prone to familial influences. For self-esteem, we would expect a similar pattern of intergenerational continuity to occur even though the literature on self-esteem transmission across generations is rare. However, other personality and behavioural characteristics such as attachment insecurity and personality vulnerabilities (which include negative evaluations of the self and setting of unrealistic standards) have been examined in intergenerational studies. For example, Besser and Priel (2005) found intergenerational associations of attachment insecurity between mothers and daughters that were mediated by depression but not self-criticism. In their study, the children's internal models were assumed to be affected by their mother's internal model and, as a consequence, to show moderate continuity between mothers and their adult daughters. Likewise, across the three generations examined in their study (grandmothers, mothers, adult daughters), the authors found significant similarities in the levels of self-criticism and other personality measures (Besser & Priel, 2005, p. 1059).

3.4.1.4 PARENT-CHILD DISCORD AS A POTENTIAL MEDIATOR IN INTERGENERATIONAL TRANSMISSION PROCESSES

In order to account for potential intergenerational transmission processes via the current familial context in which the proposed transmission could occur, we were further interested in testing parent-child discord as a mediating mechanism. Theoretically, parent-child relationship quality has been discussed as a mechanism that contributes to intergenerational transmission of depression via negative interactions between parent and child (Cummings & Davies, 1994). Furthermore, Hammen (1991) proposed an intergenerational interpersonal stress model of depression suggesting that the commonly found negative effects of maternal depression on the next generation's level of depression can be explained by the familial environment and the mother's poor interpersonal skills. Indeed, in a cross-sectional study, Hammen, Shih, and Brennan (2004) reported entirely mediated effects on youth depressive symptoms via the suggested pathway. Furthermore, Whitbeck et al. (1992) found depressed mood to be transmitted across generations via parental rejection. The underlying assumption is that depression in parents is expressed by means of self-preoccupation and less warmth and attention in the parenting of offspring (Whitbeck et al., 1992). As noted by Davies and Windle (1997), parental depression might lead to poor role modeling reducing coping strategies for growing-up individuals to manage age-specific developmental tasks. We therefore assumed that including parent-child discord (negative atmosphere between parent and child, tension and conflicts) might, at least in part, explain a possible transmission effect across generation.

In a similar line of argumentation, we assumed that G1 low self-esteem in adolescence leads to lower parenting quality in adulthood as parents with low self-esteem might show more insecurity and self-consciousness while interacting with their children, which, in turn,

contributes to the development of low self-esteem in the next generation of adolescents. Furthermore, adolescent self-esteem transmission via parent-child discord can be derived from the sociometer theory which states that self-esteem is strongly influenced by one's social acceptance or rejection reflecting an individual's position among a group of relevant others such as parents or peers (Leary & Baumeister, 2000). As individuals are in the process of forming a coherent sense of the self during adolescence, self-esteem might be especially sensitive to the social circumstances during this age period (Robins & Trznesniewski, 2006). Adolescents might be quite dependent on a loving and warm, relatively low-stress, relationship with their parents, which possibly provides them with the secure developmental framework to cope with the diverse age-specific life tasks. Thus, G1 adolescents who may not have received high quality parenting from their parents (resulting in low self-esteem), presumably carry along their low self-esteem across the lifespan and, in turn, transmit such a vicious circle to the next generation of adolescents via their own low quality parent-child interactions.

3.4.2 RESEARCH QUESTIONS AND AIMS OF THE STUDY

The present study had two major goals. First, we aimed at testing the long-term longitudinal validity of the vulnerability and scar models. That is, we tested whether the effects of self-esteem on depressive symptoms (and vice versa), hold over a time span of three decades from adolescence to middle adulthood. We hypothesized that both the vulnerability and the scar models are valid. Based on current empirical findings (Orth & Robins, 2013; Sowislo & Orth, 2013), we expected the scar effect to be somewhat weaker than the vulnerability effect.

The second major goal of the present study was to investigate the vulnerability and scar models across generations. We investigated whether G1 *adolescent* self-esteem is linked to G2's *adolescent* depressive symptoms (and vice versa). We hypothesized that G1 adolescents with low self-esteem are more likely to later have G2 adolescent children suffering from depressive symptoms compared to G1 adolescents revealing high self-esteem (vulnerability effect). Conversely, we also hypothesized that G2 adolescents would have lower self-esteem if their parents had suffered from depressive symptoms in adolescence (scar effect). We hypothesized that the intergenerational vulnerability and scar effects would be mediated by G1 adult depressive symptoms or self-esteem, respectively. Furthermore, we hypothesized that parent-child discord serves as an additional mediator for the proposed transmission processes.

To the best of our knowledge, this is the first study that tested whether the scar and vulnerability effects are valid over three decades from adolescence to middle adulthood and across generations. We compared the same age groups (G1 adolescence and G2 adolescence) of family members by means of measuring the same constructs three decades later within the main and the children cohort. Furthermore, we obtained data based on information from *both* generations (parent- and child-reported).

In our analyses, we controlled for potential gender effects based on findings indicating that self-esteem is typically higher in males compared to females, especially in adolescence (Kling, Hyde, Showers, & Buswell, 1999; Steiger et al., 2014). Gender effects were also observed for depressive symptoms, especially in adolescence, and have been discussed as a consequence of a higher amount of challenges and risk factors for adolescent girls compared to adolescent boys (Nolen-Hoeksema & Girgus, 1994). We therefore controlled for gender effects in both the long-term and intergenerational models. Furthermore, intergenerational

transmission effects have often been shown to be more pronounced in mother-child than father-child pairs (e.g., Besser & Priel, 1995; Hammen, Shih, & Brennan, 2004; Hops, 1996). In order to give consideration to this finding, we therefore tested whether the hypothesized effects would differ between mother-child and father-child pairs. We assumed to find stronger confirmation for the hypothesized intergenerational transmission effects in mother-child pairs.

3.4.3 METHODS

3.4.3.1 PARTICIPANTS

Data came from the ongoing German LifE-study (Fend et al., 2012). The LifE-study includes five measurement occasions during adolescence that followed individuals from age 12 to age 16 (years 1979 to 1983) and two follow-up measurement occasions when participants were in early (age 35; year 2002) and in middle adulthood (age 45; year 2012). The LifE-study began as a youth study with an initial sample of 2,054 students and originated from the city of Frankfurt and two rural areas in the region of Hessen (Fend, 1990, 1994). Participants of the youth study were assessed within their school settings and were comprised of a representative sample of students within the region tested. Almost two decades later, in 2002, the study was resumed and the initial participants were contacted again. Contact details were recruited via the participants' parents whose addresses were recorded during the youth study, leading to 1,853 valid addresses of the main sample (Fend, Berger, & Grob, 2009). Of the 1,853 contacted individuals from the youth study, 1,527 (82.4%) participants returned the questionnaire. Individuals who remained in the sample did not differ to the original youth sample on any of the key psychological variables such as depressive symptoms or self-esteem. The remaining sample, however, had a slightly higher socio-economic status and level of education and was

more likely to be of German origin compared to the Western German population (Fend, Grob, & Berger, 2009). Another decade later, in 2012, the second follow-up survey was conducted. From the initial study participants (n = 2,054), 66.1 % participated in the last measurement wave in 2012 (n = 1,359). Of these, 50.6 % (n = 687) were female and 78.7 % (n = 1,063) had children. For the second follow-up survey in 2012, the children of the main cohort (G2: n = 581, M_{age} = 14.9 years, 52.2 % female) were included in the study. For the *inter*generational analyses of our hypotheses, 572 complete parent-child pairs existed. These pairs consisted of 309 mother-child and 263 father-child pairs.

For this study, we used data from the age 16 and age 45 measurement occasions only, because depressive symptoms were not measured in the first four measurement occasions (age 12 – 15) and self-esteem was not measured at age 35. To test the competing effects of the vulnerability and scar models, we were therefore restricted to the age 16 (1983) and age 45 (2012) measures (in the following we refer to age 16 as T1, and age 45 as T2). Attrition analysis for the self-esteem measures revealed that individuals who continued to be part of the study at age 45 (T2) did not differ from those who participated at age 16 (T1), F (1) < 1. With regard to depression, participants at T2 did not differ from those who had dropped out of the study after age 16, F (1) < 1. The second generation of adolescents (G2: n = 581, M_{age} = 14.9 years, 52.2 % female) who participated at T2 completed the same depression scale as the adult sample as well as the same self-esteem scale as the adult sample.

3.4.3.2 MEASURES

Global self-esteem. Self-esteem was measured with six items from the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1979; for details see Fend, Berger, & Grob, 2009; Steiger et

al., 2014). Participants rated each item on a dichotomous scale (0 = *disagree*, 1 = *agree*). At T1 (age 16) eight items were administered to the participants, however, due to space limitations in the questionnaire, only the most reliable six of the original eight items were used for the adult and the children questionnaire at T2. In order to have identical measures for both measurement occasions and both samples, we only included the identical items in our analyses. This resulted in a total of six items that were administered to both samples (G1 and G2) and both measurement occasions (T1 and T2). Kuder-Richardson (1937) reliability estimates (KR-20) were .77 for age 16 (T1), .78 for G1 (T2), and .78 for G2 (T2) respectively. Items were "Overall, I'm satisfied with myself", "I think I am a person of worth", "Sometimes I feel like I am not important at all", "Sometimes I feel somewhat superfluous", "Sometimes I wish I would be totally different", and "In general, I would like to stay the way I am".

Depression T1 (Age 16). At T1, 13 items from the original Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; for details see Fend, Berger, & Grob, 2009; Steiger et al., 2014) were administered to the participants to measure depression (note that depression was not measured in the age 12 to 15 assessments). Participants indicated which sentence out of four possible answers reflected their feeling most accurately. This was done for each of the 13 symptoms. An example item is "I'm not feeling sad at all" (0) to "I'm extremely sad and unhappy; I can hardly bear it" (3). We excluded six items of this scale because they were conceptually distinct compared to the seven items used at T2. The reliability estimate (Cronbach's alpha) of this brief measure was .82.

Depression T2 (Age 45 and Adolescent Children). At T2, seven conceptually identical items from the depression scale used at T1 were administered to the adult and the adolescent sample. In the follow-up surveys, an adapted but well-established version of the BDI was used,

namely the BDI-V version (Schmitt & Maes, 2000; for a detailed discussion on the comparability between the two scales see Steiger et al., 2014). The seven items were "I feel sad", "I am tired and fatigued", I have to force myself into doing things", "I feel discouraged about the future", I am disappointed in myself", "I have thoughts of killing myself", and "I have lost interest in people". (1 = *never* to 6 = *always*). The reliability estimates (Cronbach's alph) were .86 (adult sample, G1) and α = .80 (children sample, G2).

Discord between parent and child (parent and child-reported). Three items indicated the frequency of discord, tension and conflicts between parent and child (Schneewind & Ruppert, 1992). Items are "Between me and my child are loud and heavy fights", "Between me and my child there are tensions and ill-feelings" "Between me and my child, small arguments lead to a bad atmosphere". Participants indicated on a six-point scale the frequency of the described occurrences from "never" (1) to "always" (6). The scales ranged from 3 to 18, with higher rates indicating more discord. The same items were administered to the G2 adolescent sample, but adolescents were asked to indicate each item separately for their mother and father, respectively. Items were thus slightly changed, for example to "Between me and my *mother*, there are loud and intense fights" or "Between me and my *father*, there are loud and intense fights". Reliability estimates for this scale was well for both the adult (α = .85) and the adolescent sample reporting on discord with their mothers (α = .86) and their fathers (α = .85), respectively.

3.4.3.3 PLAN OF ANALYSIS

We estimated cross-lagged regression analyses (Jöreskog, Sörbom, & Magidson, 1979; Kenny, 1975) using MPlus (Muthen & Muthen, 1998 - 2010) with latent self-esteem and depression factors to correct for measurement errors (see Figures 3-5). The six self-esteem items were allocated to two parcels (consisting of the mean scores of three items per parcel) that served as indicators for each measurement occasion and the seven depression items were allocated to three parcels (consisting of the mean scores of three or two items per parcel) as indicators for each latent depression factor. Self-esteem and depression parcels were built according to the item-to-construct-balancing method (Little, Cunningham, Shahar, & Widaman, 2002). Based on the suggestions by Geiser (2011) and Selig, Preacher and Little (2012) for the specification of latent autoregressive cross-lagged models, loadings and intercepts of the corresponding parcels were set equal across time.

We investigated *long-term* associations of self-esteem and depressive symptoms over time (see Figure 3, top figure). That is, we tested the influence of adolescent self-esteem on depressive symptoms in middle adulthood, controlling for the stability of self-esteem over time. At the same time we tested the influence of adolescent depressive symptoms on self-esteem in middle adulthood, controlling for the stability of depressive symptoms over time. Self-esteem and depressive symptoms were allowed to covary at T1 and T2. In the first model, we did not include any control variables whereas in the second model we controlled for gender for each of the latent variable. As the results remained virtually identical with and without gender as covariate, only the results of the model that controlled for gender are reported.

Next, we tested the vulnerability and scar effect across generations (see Figure 3, bottom figure). That is, we modeled G2 adolescent self-esteem and depressive symptoms as dependent

variables and tested the influence of G1 adolescent self-esteem and depressive symptoms on G2 adolescent self-esteem and depressive symptoms, respectively. We then entered G1 gender as controls for G1 self-esteem and G1 depressive symptoms and G2 gender as a control for the G2 latent constructs. As results remained virtually identical with and without gender as covariate, we only report the model that controlled for gender.

Finally, we ran a series of model that tested mediating mechanisms. First, we tested whether G1 adult self-esteem and G1 adult depressive symptoms would serve as mediators for transmission effects across generations. Thus, we extended Figure 3 by integrating G1 adult depressive symptoms and self-esteem for the links between self-esteem and depressive symptoms across generations (Mediation Model 1, see Figure 4).

Second, we further included parent-child discord as an additional potential mediator between G1 adolescent self-esteem and depressive symptoms and G2 adolescent self-esteem and depressive symptoms, respectively (Mediation Model 2, see Figure 5). Finally, we tested a grouped model for mother-child and father-child pairs in order to test differences between intergenerational transmission effects by gender. We employed a bootstrapping approach with 5000 samples to test the significance of the indirect effects (Preacher & Hayes, 2008) and we report bias-corrected bootstrap 95% confidence intervals.

3.4.4 RESULTS

3.4.4.1 LONG-TERM VULNERABILITY AND SCAR EFFECTS

Tables 8 and 9 include descriptive statistics and zero-order correlations of the study variables. Figure 3 (top figure) reports the long-term stability coefficients and long-term cross-lagged effects as described in the plan of analysis, controlling for possible gender effects. The

long-term vulnerability and scar model exhibited a good model fit, $\chi 2$ (36) = 178.57, $p < .001$, CFI = .972, RMSEA = .054 (90% CI = .046-.062). Both self-esteem and depressive symptoms were shown to be moderately stable over time and both the vulnerability effect ($\beta = -.21$, $p < .001$) and the scar effect ($\beta = -.12$, $p < .05$) were shown to be valid across three decades. Gender as control variable and self-esteem were moderately associated at age 16 ($\beta = .24$, $p < .001$), favoring males over females. No gender differences were found for G1 adolescent depressive symptoms, self-esteem at age 45, and depressive symptoms at age 45. Taken together, the vulnerability and the scar models have been confirmed across three decades, albeit with weaker effects for the scar model. We tested whether the vulnerability and scar effects significantly differed in effect size by comparing a model with equal effects compared to a model with freely estimated vulnerability and scar effects. A comparison between the models revealed a significant difference in χ^2, in support of the model that estimated the effects freely $\Delta\chi^2 = 20.50$, $\Delta\ df = 1$, $p < .001$. This indicated a stronger effect for the vulnerability model.

TABLE 8: DESCRIPTIVES OF STUDY 3

Means and Standard Deviations for Self-Esteem, Depression and Parent-Child Discord Scales

	G1 Adolescence *M* (*SD*)	G1 Middle Adulthood *M* (*SD*)	G2 Adolescence *M* (*SD*)
Self-Esteem[a]	10.29 (1.77)	10.94 (1.53)	10.59 (1.69)
Depression[b]	2.37 (3.30)	13.86 (4.95)	14.46 (5.03)
Discord with Child[c]	-	7.20 (2.17)	-
Discord with Mother[c]	-	-	7.72 (2.99)
Discord with Father[c]	-	-	7.13 (2.82)

Note. *N* = 1,359 for main sample, *N* = 581 for Generation 2 adolescent sample. [a]Scale ranged from 6 to 12;

[b]Scale ranged from 0 to 21 for G1 adolescence and from 7 to 42 for G1 middle adulthood and G2 adolescence;

[c]Scale ranged from 3 to 18. G1 = Generation 1, G2 = Generation 2.

TABLE 9: ZERO-ORDER CORRELATIONS FOR VARIABLES OF STUDY 3

Zero-Order Correlations for Self-Esteem, Depression and Parent-Child Discord Scales in Adolescence and Adulthood

	1	2	3	4	5	6	7	8	9
1) Self-Esteem Adolescence G1	-								
2) Self-Esteem Adulthood G1	.298**	-							
3) Self-Esteem Adolescence G2	.028	.103*	-						
4) Depression Adolescence G1	-.345**	-.170**	-.058	-					
5) Depression Adulthood G1	-.242**	-.636**	-.138**	.180**	-				
6) Depression Adolescence G2	-.039	-.087*	-.616**	.149**	.170**	-			
7) Discord with Child	-.144**	-.190**	-.192**	.091	.281**	.191**	-		
8) Discord with Mother	-.083	-.064	-.264**	.114*	.094*	.386**	.406**	-	
9) Discord with Father	-.067	-.022	-.329**	.007	.082	.309**	.328**	.384**	-

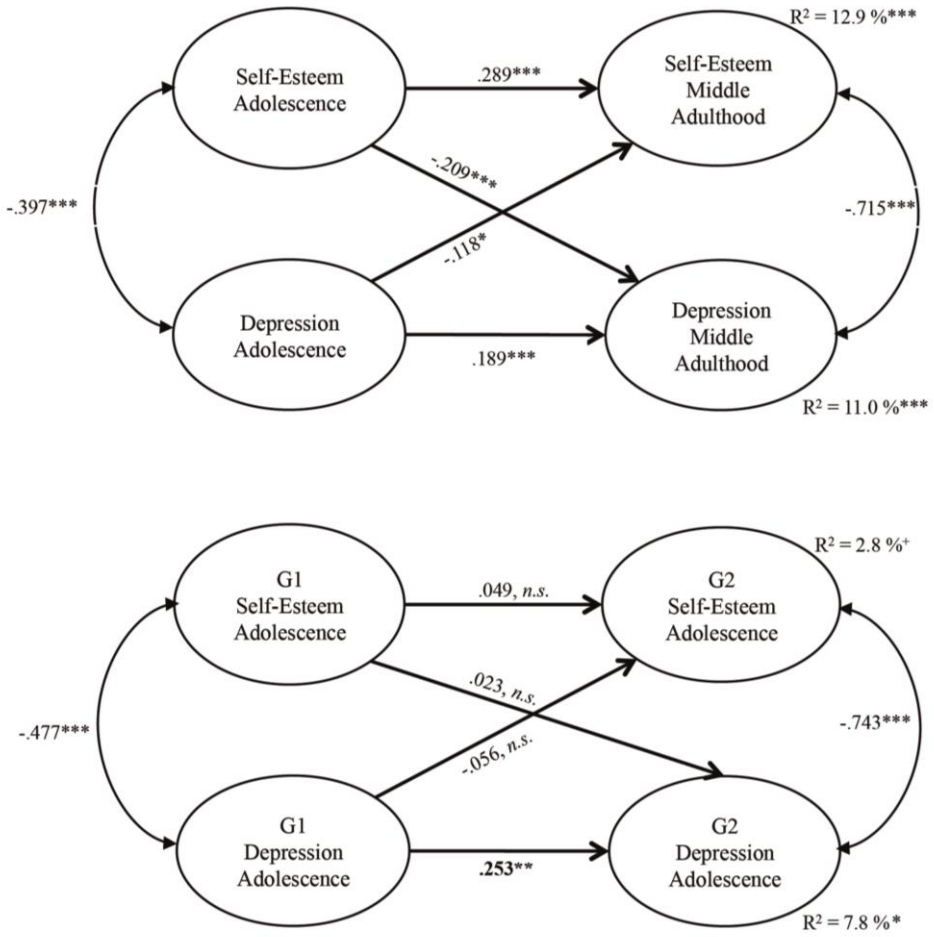
Note. *$p < .05$, **$p < .01$, ***$p < .001$. G1 = Generation 1, G2 = Generation 2.

FIGURE 3

LONG-TERM AND INTERGENERATIONAL VULNERABILITY AND SCAR EFFECTS

Cross-lagged regression analysis testing the long-term (top figure) and intergenerational (bottom figure) vulnerability and scar effect, standardized beta-coefficients. Both models controlled for gender for each latent variable,

$^{+}p < .10$, $*p < .05$, $**p < .01$, $***p < .001$. G1 = Generation 1, G2 = Generation 2.



3.4.4.2 INTERGENERATIONAL RESULTS

The model including gender as a covariate evidenced a good fit, $\chi 2$ (46) = 83.78, $p < .001$, CFI = .981, RMSEA = .038 (90% CI = .025-.051). The results did not support the claim for vulnerability or scar effect across generations (see Figure 3, bottom figure). That is, G2 self-esteem in adolescence was not influenced by G1 adolescent depression nor was G2 adolescent depression influenced by G1 adolescent self-esteem.

We found a moderately strong direct transmission effect from G1 adolescent depression to G2 adolescent depression ($\beta = .25$, $p < .01$, see Figure 3). G1 self-esteem was significantly associated with gender, again favoring males over females ($\beta = .30$, $p < .001$), as was G2 self-esteem ($\beta = .14$, $p < .01$). Consistent with the literature, G2 depressive symptoms were slightly more pronounced in females than males ($\beta = -.14$, $p < .01$).

3.4.4.3 MEDIATION EFFECTS: ADULT DEPRESSIVE SYMPTOMS AND SELF-ESTEEM

We performed mediation analyses with G1 adult depressive symptoms and self-esteem as possible mediators for the links between G1 adolescent and G2 adolescent self-esteem and depressive symptoms (see Figure 4 and Table 10, Mediation Model 1). The model fitted well, $\chi 2$ (96) = 171.77, $p < .001$, CFI = .977, RMSEA = .037 (90% CI = .028-.046). The direct transmission effect from G1 adolescent to G2 adolescent depressive symptoms ($\beta = .25$, $p < .05$) remained virtually identical compared to the unmediated model. G1 adult depressive symptoms, however, did not serve as a mediator for the link between G1 adolescent to G2 adolescent depressive symptoms, as the 95% confidence intervals included zero (indirect effect: $\beta = .03$, $p = .285$, 95% CI: -.024, .080). The same was true for G1 adult self-esteem (indirect effect: $\beta = -.00$, $p = .828$, 95% CI: -.023, .018). Similarly, as for the proposed intergenerational

vulnerability (direct effect: β = .07, p = .384) and scar effects (direct effect: β = -.04, p = .989), the mediation analyses further revealed non-significant indirect results (indirect vulnerability effect: β = -.07, p < .10, 95% CI: -.138, .005; indirect scar effect: β = .00, p = .99, 95% CI: -.017, .017).

TABLE 10: INTERGENERATIONAL MEDIATION MODELS

Model Fits, Stability Coefficients, and Cross-Lagged Effects for Self-Esteem and Depressive Symptoms, including Direct and Indirect Effects (Standardized Coefficients are Reported)

			Depression			**Self-Esteem**								
			G1→ G2 Continuity Effect			**G1→ G2 Continuity Effect**			**G1→ G2 Vulnerability Effect**			**G1→ G2 Scar Effect**		
Model fit indices			Direct	Indirect	Indirect	Direct	Indirect	Indirect	Direct	Indirect	Indirect	Direct	Indirect	Indirect
	CFI	RMSEA	G1 D-Y G2 D-Y	via G1 D-MA / G1 SE-MA	via PCD	G1 SE-Y G2 SE-Y	via G1 D-MA / G1 SE-MA	via PCD	G1 SE-Y G2 D-Y	via G1 D-MA / G1 SE-MA	via PCD	G1 D-Y G2 SE-Y	via G1 D-MA / G1 SE-MA	via PCD
M1	.98	.037	**.225***	.028 /-.002	-	-.001	.049 / .001	-	.068	-.067^{+} / .023	-	-.038	-.021 / .000	-
M2	.98	.036	**.226****	.018 / -.001	.007	-.020	.027/ .008	.037^{+}	.086	-.050 / .019	-.034^{+}	-.040	-.010 / -.001	-.008

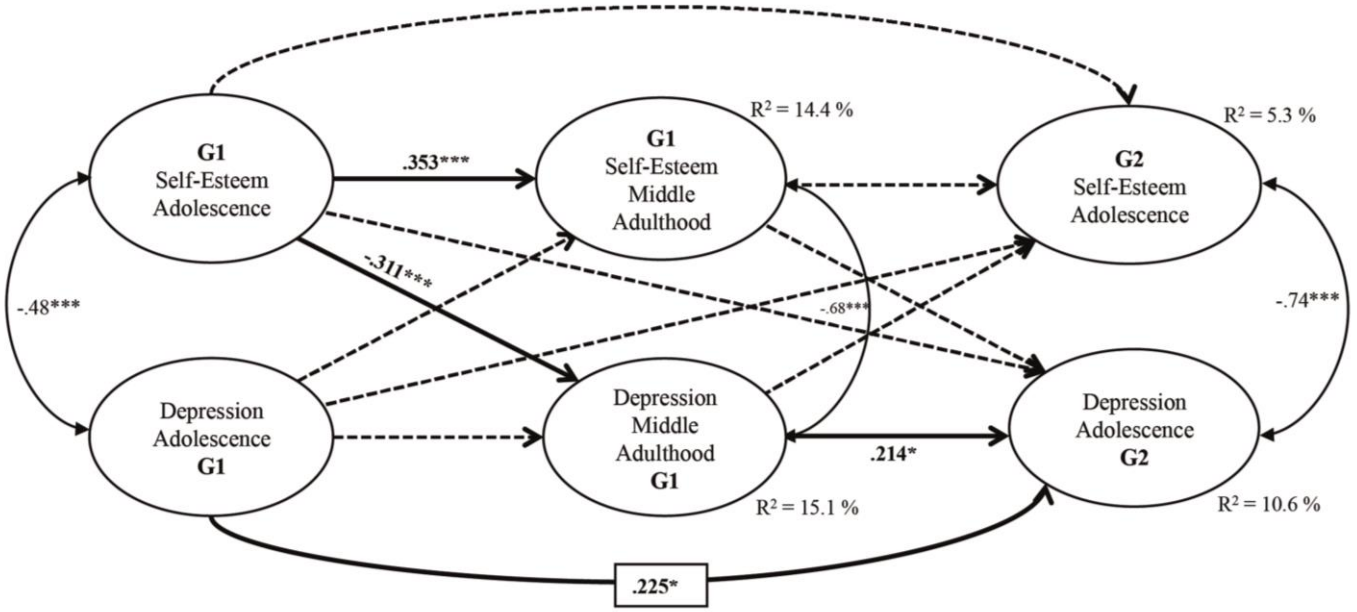
Note. ^{+}p <.10, *p < .05, **p < .01. D = Depression, SE = Self-Esteem, G1 = Generation 1, G2 = Generation 2, Y = Young (Adolescence), MA = Middle Adulthood (Age 45), PCD = Parent-Child-Discord. M1: Mediation Model 1: G1 Adolescent Self-esteem and Depression → G1 Adult Self-Esteem and Depression → G2 Self-Esteem and Depression (n = 565), controlled for Gender G1 (on G1 constructs) and Gender G2 (on G2 constructs), see Figure 4. M2: Mediation Model 2: G1 Adolescent Self-esteem and Depression → G1 Parent-Child Discord (parent-reported) / G1 Adult Self-Esteem and Depression → G2 Self-Esteem and Depression (n = 565), controlled for Gender G1 (on G1 constructs) and Gender G2 (on G2 constructs), see Figure 5.

FIGURE 4

INTERGENERATIONAL MEDIATION MODEL 1

Cross-lagged regression analysis testing the vulnerability and scar effect of self-esteem and depression across generations with G1 adult self-esteem and depressive symptoms, controlled for gender (see Table 10, Model 1). *$p < .05$, **$p < .01$, ***$p < .001$.

G1 = Generation 1, G2 = Generation 2.



3.4.4.4 MEDIATION EFFECTS: PARENT-CHILD DISCORD

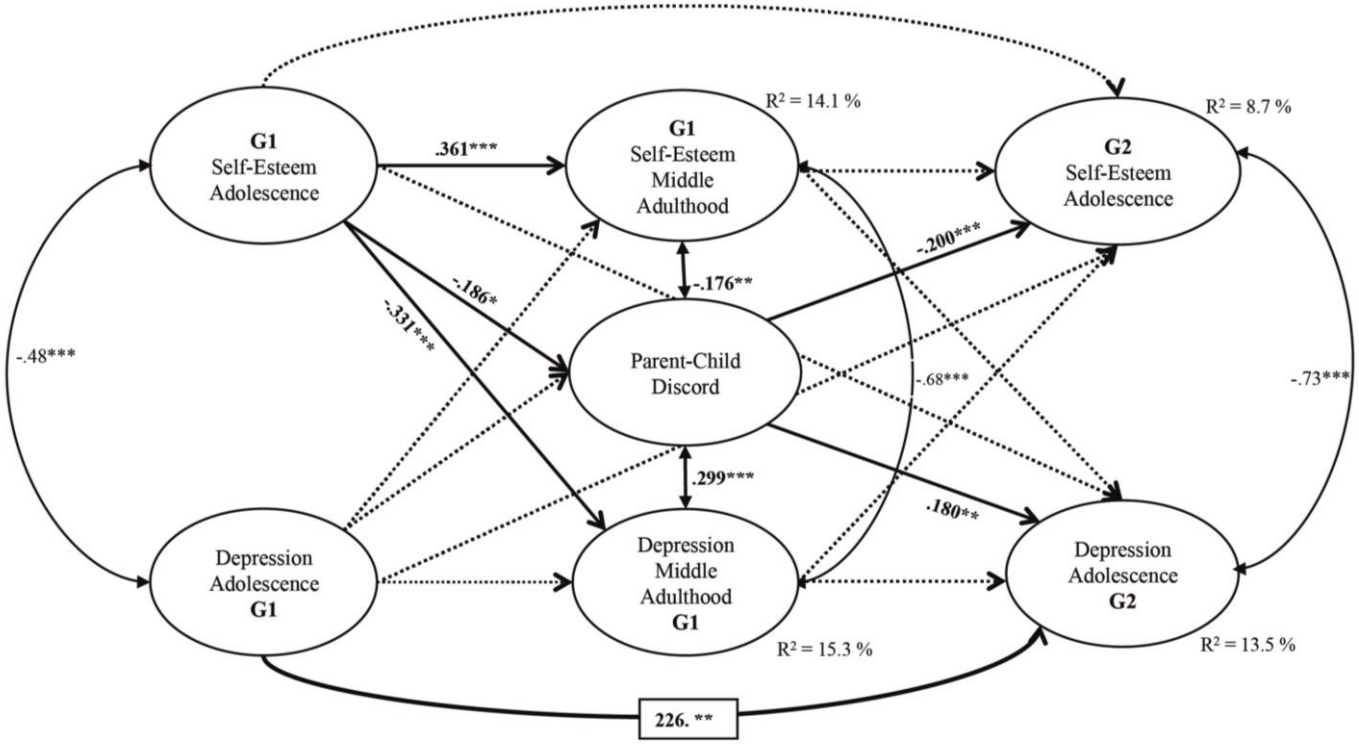
We then included parent-child discord as an additional mediator in the model (see Figure 5 and Table 10, Mediation Model 2). The model evidenced a good fit, $\chi 2$ (141) = 245.42, p < .001, CFI = .975, RMSEA = .036 (90% CI = .029-.044). Over the time span of three decades G1 adolescent self-esteem was negatively associated with parent-child discord at age 45 (β = -.19, p < .05). In contrast, G1 adolescent depressive symptoms were not related to parent-child discord at age 45 (β = .04, p = .68). As for the hypothesized intergenerational vulnerability and scar effects, we did not find evidence for a direct (β = .09, p = .26) or indirect vulnerability (β = -.05, p = .19, 95% CI: -.124, .025) nor a direct (β = -.04, p = .59) or indirect scar effect (β = -.00, p = .95, 95% CI: -.017, .016.)

The direct effect from G1 adolescent depressive symptoms to G2 adolescent depressive symptoms remained the same (β = .23, p < .01). Our analysis indicated that parent-child discord did not serve as the mediator between adolescent G1 and G2 depressive symptoms (β = .01, p = .69, 95% CI: -.027, .040) nor between adolescent G1 and G2 self-esteem (β = .04, p < .10, 95% CI: .00, .075).

FIGURE 5

INTERGENERATIONAL MEDIATION MODEL 2

Cross-lagged regression analysis testing the vulnerability and scar effect of self-esteem and depression across generations with G1 adult self-esteem and depressive symptoms and parent-child discord as mediators, controlled for gender, (see Table 10, Model 2). *p < .05, **p < .01, ***p < .001. G1 = Generation 1, G2 = Generation 2.



3.4.4.5 MEDIATION EFFECTS: GENDER DIFFERENCES

In our final model, we tested a grouped mediation model to examine whether the hypothesized effects would differ by gender (mother-child vs. father-child pairs). This model had an adequate fit, $\chi 2$ (226) = 353.61, $p < .001$, CFI = .969, RMSEA = .044 (90% CI = .035-.053). Interestingly, we found that the direct transmission effect disappeared in father-child pairs (β = .11, $p = .48$) but became even stronger in mother-child pairs (β = .30, $p < .05$). In line with our previous models, however, we did not find evidence for direct intergenerational vulnerability or scar effects in either the mother-child (vulnerability effect: β = .11, $p = .23$; scar effect: β = -.06, $p = .65$) or the father-child pairs (vulnerability effect: β = .09, $p = .57$; scar effect: β = .01, $p = .95$). With regard to the mediating mechanisms, we did not find evidence that G1 adult depressive symptoms served as a mediator for the hypothesized vulnerability effect in mother-child (β = -.05, $p = .28$, 95% CI: -.127, .037) nor in father-child pairs (β = -.06, $p = .50$, 95% CI: -.244, .118). Furthermore, G1 adult self-esteem did not serve as a mediator for the hypothesized scar effect in mother-child (β = -.02, $p = .56$, 95% CI: -.086, .046) or father-child pairs (β = -.03, $p = .67$, 95% CI: -.174, .112). Finally, parent-child discord did not serve as a mediator in the transmission of depressive symptoms between mother and child (β = .05, $p = .11$, 95% CI: -.012, .118) or between father and child (β = .00, $p = .995$, 95% CI: -.024, .023). The same was true for the transmission of self-esteem between mother and child (β = .01, $p = .56$, 95% CI: -.027, .049) and between father and child (β = .02, $p = .60$, 95% CI: -.044, .076). Taken together, we did not find evidence for the proposed mediated mechanisms even when differentiating between mother-child and father-child pairs.

3.4.5 DISCUSSION

The present study examined whether the vulnerability and scar models are valid from adolescence to middle adulthood and across two generations. As a first goal, we examined the long-term vulnerability and scar effects from adolescence to middle adulthood. The results showed that individuals suffer from the consequences of low self-esteem and depressive symptoms as they move through different developmental stages of their life. Low adolescent self-esteem was substantially related to adult depressive symptoms at age 45. That is, the vulnerability effect was confirmed from adolescence up to middle adulthood. The scar model was also confirmed, albeit with weaker effects compared to the vulnerability model. The current findings are in line with our previous longitudinal results using the same data set until *age 35*, were we showed that self-esteem in adolescence prospectively predict early adult depression (Steiger et al., 2014). Our findings are also in line with previous albeit shorter longitudinal studies that found the vulnerability effect to be about twice as large as the scar effect (Orth & Robins, 2013; Sowislo & Orth, 2013). The current results clearly contribute to a better understanding of the *long-term* relevance of adolescent self-esteem and depressive symptoms across the lifespan. The larger effect of self-esteem on depressive symptoms points to the importance of building up a coherent sense of the self during adolescence (a critical age period for identity development, Erikson, 1968). However, it is possible that low self-esteem in adulthood might have the same long-term consequences as it has in adolescence but we could not test this assumption. It is likely, though - as identity processes consolidate at the end of adolescence - that it becomes more and more difficult to bolster self-esteem with increasing age. Therefore, during adolescence, building up self-esteem in the process of identity formation, might be regarded as sensitive and crucial.

As a second goal, we tested the validity of the proposed intergenerational vulnerability and scar effects. The results did not support our hypotheses of intergenerational vulnerability and scar effects. However, such effects are still possible over shorter time periods as the time span of three decades in this study might be too long to detect intergenerational effects of self-esteem and depressive symptoms. Future studies should investigate intergenerational vulnerability and scar effects in studies with shorter time periods to examine the dynamics between parents and their children with regard to self-esteem and depressive symptoms. Furthermore, it is important to note that adolescence is a time of new social orientation (towards peers and away from the family). As such, it is possible that effects might be easier to detect earlier in life as they might attenuate during the adolescent age period. Future studies should therefore test these hypotheses prior to adolescence when family orientation is stronger.

With regard to the continuity effects across generations, we found a moderately strong direct continuity effect of G1 adolescent to G2 adolescent depressive symptoms. This direct transmission effect of depressive symptoms from G1 to G2 adolescence remained unaltered even after including potential mediators. This is a remarkable finding considering the time period of three decades between the measurement of G1adolescent depressive symptoms (year 1983) and G2 adolescent depressive symptoms (year 2012). Indeed, real intergenerational transmission effects are only given (a) if the parent and the child are studied with a *time-delay* (here we not only used data with a simple time-delay but even investigated the same age period; adolescence G1 → adolescence G2), (b) if *both* members (here: G1 adolescent and G2 adolescent) of the family are questioned and (c) if the concurrent association between G1 and G2 is considered in the model (here: G1 adult depressive symptoms and self-esteem were tested as mediators) (Baier & Hadjar, 2004). Many studies claim testing intergenerational

transmission effects, however, they simply report concurrent similarities between family members as values or attitudes are questioned at the same measurement occasion (e.g., Knafo & Schwartz, 2001; Phalet & Schönpflug, 2001). Our sample is therefore unique because it consists of former adolescents, the same individuals as grown-up adults (aged 45) and their children in adolescence and, finally, information was acquired from both informants, that is, from parents and children.

How can we explain the intergenerational transmission effect for depression? There are several possible pathways for intergenerational transmission effects. First, it is possible, that depressive symptoms are "passed on" to the next generation via genes or epigenetic effects. That is, similarities between family members might be explained by shared genes because they reflect the basis of both the parental and child personality (for reviews, see Plomin, DeFries, McClearn, & Rutter, 1997; Rutter, 2006) or certain experiences during sensitive age periods can result in epigenetic alterations that, in turn, influence pathological development (Rutten & Mill, 2009). Fendrich, Warner and Weissman (1990) suggest both a genetic and an environmental pathway for the transmission of depression. In their study, for children of depressed parents, parental depression was the most important predictor of developing depression in offspring, whereas the presence of adverse environmental factors such as parent-child discord increased the risk for major depressive disorder in children of non-depressed parents. The authors suggested that children of depressed parents may become ill before the family risk factors become powerful (Fendrich et al., 1990). This finding would suggest differentiating between offspring of depressed and non-depressed parents and study intergenerational transmission processes at different developmental periods, ideally starting in

childhood in order to shed further light on the diverging genetic and environmental influences for the development of depressive symptoms.

Furthermore, our measure of parent-child discord focused on bad atmosphere and tension between parent and child. As such, it is possible that more subtle measures would capture parental rejection and/or miscommunication and little warmth better, possibly clarifying the explanatory chain from G1 to G2 adolescent depressive symptoms. Future research should include a measure representing little warmth, attention and low affection from parents towards their children combined with bad communication patterns to test further mechanisms, as suggested by earlier studies testing transmission processes of depression via parental rejection, interpersonal stress and family discord (Davies & Windle, 1997; Hammen, Shih, & Brennan, 2004; Whitbeck et al., 1992).

With regard to intergenerational continuity of self-esteem, no effects were found. Compared to depressive symptoms which may be quite strongly influenced by a history of familial pathology, it is likely that self-esteem is more amenable to the current social situation. As adolescence is a time of strong peer-orientation, peer popularity may lead to positive self-views rather than the parent-child relationship or the parental history of self-esteem formation. It is likely, too, that due to the identity processes that are taking place during this age period, most adolescents deal with some self-consciousness but only a few of them suffer from depressive symptoms. Indeed, self-esteem in adolescence differs from self-esteem in childhood (or from later developmental periods such as adulthood), insofar as the mean-level of self-esteem typically drops during adolescence (Robins & Trzesniewski, 2005). Also, the rank-order stability of self-esteem is lower in adolescence compared other age periods suggesting that it is more vulnerable to specific environmental influences (Trzesniewski, Donnellan, Robins, 2003).

Indeed, self-esteem is considered to become more trait-like with increasing age (Donnellan, Kenny, Trzesniewski, Lucas, & Conger, 2012). Therefore, future studies might focus on later periods of self-esteem transmission processes when individuals have a more coherent view of the self.

Taken together, several factors (e.g., measure of family discord, the long time period, initial age of participants) might have been responsible for the null findings with regard to the proposed intergenerational transmission processes. Future studies should include genetic, personality, and behavioral variables to account for genetic and epigenetic factors (e.g., testing the impact of early trauma) along with environmental, behavioral and personality developmental patterns across the lifespan, ideally by means of a cohort-sequence study design that can test intergenerational transmission patterns at different developmental periods.

3.4.5.1 LIMITATIONS

Although this study had several major advantages including the longitudinal scope from age 16 to age 45, the inclusion of two generations in a large sample size and advanced statistical modeling, several limitations must be noted. First, the depression measures differed slightly from T1 and T2. Note, however, that we extracted seven conceptual identical items for our analysis and that the new measure (BDI-V, Schmitt & Maes, 2000), is based on the original BDI depression scale. These scales have been extensively tested against each other, revealing very similar results (Schmitt et al., 2003; for a detailed discussion on the comparability of the two scales, see Steiger et al., 2014). Furthermore, with regard to our measure of depressive symptoms, it must be noted that the BDI scale is not a measure for a thorough diagnosis of major depressive disorder but rather represents a continuum of depressive symptoms. It would

be interesting to replicate the current findings in a clinical sample and/or with informant-based measures of depression.

Second, it would have been valuable to test the scar and vulnerability models with more than two measurement occasions in order to include developmental changes across adolescence and adulthood. Studying self-esteem and depression trajectories would provide additional information to better understand the developmental dynamics of self-esteem and depressive symptoms and how these constructs mutually influence each other. Because self-esteem was not administered to the adult sample at age 35 and depressive symptoms were not administered to the sample before age 16 it was impossible to test the competing effects of the scar and vulnerability model in more than two measurement waves.

Third, the potential mediating variables were measured concurrently to the dependent constructs (both at T2). That is, even if we had found evidence for mediating effects across generations, it must be noted that a causal interpretation of such mechanisms would have been critical as it could be the case that G2 and G1 self-esteem and depressive symptoms mutually influence each other at T2.

Finally, future studies should devote more attention to possible gender effects. Even though we estimated a grouped mediated model for mother-child and father-child dyads, the focus of this study lay in testing mediating mechanisms of the vulnerability and scar model across generations. Our results, however, point in the direction that mother-child pairs reveal stronger direct transmission effects for depressive symptoms compared to father-child pairs. With regard to indirect mechanisms, the grouped model revealed the same results as in our previous models. We are planning on testing and discussing the diverging finding with regard

to the transmission of depressive symptoms between mother-child and father-child pairs in further detail in another study.

3.4.5.2 CONCLUSIONS

Our findings have major theoretical and practical implications. First, low self-esteem and high depressive symptoms must be considered not only as short-term but as life-long risk factors that tend to be effectual across different developmental stages. Intervention studies may be more concerned with boosting self-esteem than with lowering depressive symptoms because the vulnerability effect has been shown to be stronger than the scar effect. Second, our study revealed that depressive symptoms in one generation of adolescents are related to the next generation's level of depressive symptoms but no transmission effect for self-esteem occurred. These findings suggest that depressive symptoms might be more strongly influenced via genetic pathways whereas self-esteem is more likely to be formed through the experiences individuals make as they move through different developmental stages of their life. Future studies might test additional mediating mechanisms as proposed above that possibly account for transmission effects of self-esteem and depressive symptoms across generations.

3.5 STUDY 4: ANTECEDENTS OF ADOLESCENT SELF-DEVELOPMENT: PARENTS?[9]

3.5.1 THEORETICAL BACKGROUND

There is a very common belief that positive parent-child relationships foster children's healthy feelings of overall self-worth (i.e., global self-esteem). For example, Susan Harter, an expert on the development of self-esteem, stated, "For securely attached infants, a working model of self as valued, loved, and competent will emerge in the context of a working model of parents as emotionally available, loving, sensitive, and supportive of mastery attempts" (Harter, 2006, p. 519), and Alan Sroufe, an expert on parent-child relationships, stated, "Nothing is more important for the child's development than the quality of care received" (Sroufe, 2002, p. 187). Cross-sectional, correlational studies provide ample support for this relation between parent-child closeness and self-esteem (e.g., Barber, Chadwick, & Oerter, 1992; Rice, 1990; Verschueren, Marcoen, & Schoefs, 1996; Whitbeck, Simons, Conger, Lorenz, & Huck, 1991). However, longitudinal research does not provide clear support that positive parent-child relationships predict the development (i.e., change) of self-esteem over time (Allen, Hauser, Bell, & O'Connor, 1994; Boudreault-Bouchard, et al., 2013; Greene & Way, 2005; Roberts & Bengtson, 1996; Yang & Schaninger, 2010). This pattern of conflicting findings (i.e., robust concurrent correlation, but no consistent longitudinal correlation) could mean that (a) the relation between parent-child relationships and self-esteem reflects a reverse effect (i.e., self-esteem predicts the development of positive parent-child relationships over

[9] A shortened version of this study is under review in *Child Development*:

Harris, M. A., Steiger, A. E., Ferrer, E., Donnellan, B. M., Allemand, M., Fend, H. A., Conger, R. D., & Trzesniewski, K. H. (under review). Do parents foster self-esteem? Testing the prospective impact of parent closeness on adolescent self-esteem.

time); (b) the relation is complex and requires advanced statistical modeling, which mostly has not been used in this area, to capture the process by which parenting impacts the development of self-esteem; (c) the inconsistency in longitudinal studies reflects critical differences that prevent detection of the true effect; (d) the true effect is small and therefore difficult to detect without adequate sample sizes; and/or (e) the relation between self-esteem and parent-child relationships is spurious (both might be caused by a third variable). The current study evaluates evidence for these possibilities during adolescence, a critical time to study self-esteem change.

3.5.1.1 WHY STUDY THE DEVELOPMENT OF SELF-ESTEEM?

There is substantial and robust evidence that self-esteem (a subjective feeling of one's overall worthiness) is associated with mental and physical health indicators. For example, self-esteem is related to positive affectivity (Brown & Marshall, 2001; Heatherton & Polivy, 1991), subjective well-being (DeNeve & Cooper, 1998; Diener & Diener, 1995), task persistence (Di Paula & Campbell, 2002; McFarlin, Baumeister, & Blascovich, 1984), economic wealth (Kuster, Orth, & Meier, 2013; Trzesniewski, et al., 2006), healthy life styles (Vohs, Bardone, Joiner, Abramson, & Heatherton, 1999), lower rates of depressive symptoms (Orth, Robins, Trzesniewski, Maes, & Schmitt, 2009; Sowislo & Orth, 2013; Steiger, Allemand, Robins, & Fend, in press; Tennen & Herzberger, 1987), loneliness (Jones, Freemon, & Goswick, 1981), and lower anxiety (Sedikides, Rudich, Gregg, Kumashiro, & Rusbult, 2004; Sowislo & Orth, 2013) as well as lower aggression, delinquency, and antisocial behavior (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005). In addition, self-esteem has been shown to have a long-term impact. For example, adolescents with lower self-esteem, compared to those with higher self-esteem, are more likely as adults to have mental and physical health problems,

antisocial behavior, and educational, occupational, and monetary trouble, suggesting that how self-esteem develops during adolescence is associated with consequential life outcomes (Steiger et al., 2014; Trzesniewski et al., 2006).

3.5.1.2 WHERE DOES SELF-ESTEEM COME FROM?

Given that self-esteem is related to important life outcomes, it is crucial to understand its developmental antecedents. The most common and longstanding belief is that self-esteem stems in large part from relationships with others. For example, Cooley (1902) and Mead (1934) suggested that a person comes to view him/herself through the lens of others' opinions (i.e., reflected appraisals). This concept is illustrated in research showing that having a warm and supportive relationship partner leads to increases in self-esteem over time (Murray, Holmes, & Griffin, 2000). Others have taken this theory further by suggesting that dispositional self-esteem is an adaptive trait that evolved to serve as an indicator of how accepted one is by a social group. That is, given that humans need to belong to a social group to survive, it is necessary to know when one is being rejected. According to this sociometer theory, self-esteem serves as a social indicator of acceptance or rejection (Leary & Baumeister, 2000; Leary, Cottrell, & Phillips, 2001).

Perhaps the most widely discussed theory regarding the development of self-esteem suggests that it develops directly from the quality of the parent-child relationship. For example, attachment theory suggests that a secure attachment with a primary caregiver will facilitate feelings of self-worth and importance (Sroufe, 2002; Thompson, 2006). Through consistent, warm, and supportive interactions with a caregiver, a child is thought to develop an internal working model that consists of positive views of the self; that is, the child will develop a view

of self as important and worthy of love (Thompson, 2006). Overall, these theories and empirical findings suggest that the parent-child relationship is likely an important influence on the development of self-esteem.

3.5.1.3 WHEN IN DEVELOPMENT SHOULD THE RELATION BETWEEN THE PARENT-CHILD RELATIONSHIP AND SELF-ESTEEM BE STUDIED?

Although there is a clear conceptual connection between attachment processes and global self-esteem, there is ambiguity concerning the optimal time to test for associations between self-esteem and parent-child relationships. One reason for this ambiguity is that the internal working model is thought to develop during the first year of life (Thompson, 2006), whereas a rudimentary sense of self does not develop until the second year of life (Harter, 1983), and a global evaluation of the self is thought to not develop until early or even middle childhood (Harter, 1983). Due to these considerations, self-esteem development has scarcely been investigated before middle childhood. In addition, despite the development of some methodologies for assessing young children's global self-esteem (see Verschueren, Marcoen, & Schoefs, 1996), there continues to be debate as to whether childhood self-evaluations are valid. That is, self-esteem during middle childhood tends to be unrealistically positive and may not be comparable to global self-esteem in adolescence and adulthood (e.g., Harter 1983; Marsh, Craven, & Debus, 1991; Trzesniewski, Kinal, Donnellan, 2010). Thus, adolescence rather than childhood is a less controversial time to study the antecedents of global self-esteem.

Ideally, the relation between the parent-child relationship and self-esteem would be studied at a time of initial development of the two, but that is not possible given these developmental

and methodological issues. An alternative is to study the relation at a time of transition when either the parent-child relationship, the child's self-esteem, or both are changing. Adolescence is such a period given that an adolescent's self-view is changing and their relationships with their parents are also going through a period of reorganization (e.g., changing expectations, independence). Although the classic idea of adolescence being a time of intense and unqualified "storm and stress" (Hall, 1904) is usually dismissed by developmentalists (e.g., Eccles, Midgley, Wigfield, Buchanan, Miller, & Reuman, 1993; Petersen, 1988; Steinberg & Morris, 2001), adolescence is still considered a time of relatively large amounts of change and asynchrony in the maturation of different developmental systems (Arnett, 1999; Casey et al., 2010). For example, Eccles (1999) stated, "few developmental periods are characterized by so many changes at so many different levels as early adolescence" (p. 36; see also Blakemore & Mills, 2014; Steinberg, 2005). These changes are likely to impact the family system and lead to changes in parent-child relationships, thereby providing an important opportunity to evaluate the connections between the development of self-esteem and parent-child relationships.

3.5.1.4 PREVIOUS RESEARCH ON PARENT-CHILD RELATIONSHIPS AND SELF-ESTEEM

Theories of parent-child relationships and self-esteem suggest competing hypotheses regarding the relation between these two constructs. As noted above, self-esteem is thought to stem from relationships with important others, such as parents, but research on adolescence suggests that parent influences might weaken as children progress through the adolescent period. For example, social relationships become less hierarchical throughout adolescence, with a greater focus on peers (Bornstein, Jager, & Steinberg, 2012). This suggests that parents might have a weak impact on self-esteem during the adolescent years. Other research suggests that

there is reason to believe that parental support does not decline in importance for self-esteem during adolescence (Harter, 2006), and attachment research suggests that relationships with parents exert a continuing influence on the development of the self. Thus, there are competing hypotheses regarding whether adolescents' relationships with parents and self-esteem are related during adolescence.

Numerous studies have found a significant, concurrent relation between relationships with parents (conceptualized in these studies as perceived attachment, conflict, warmth, trust, support, affection, or responsiveness) and self-esteem (conceptualized in these studies as social worth, self-regard, mastery, low self-denial, and positiveness of self). This relation has been found across countries (e.g., Norway, Australia, United States, China, Japan) and ages (e.g., Barber, Chadwick, & Oerter, 1992; Verschueren, Marcoen, & Schoefs, 1996; Whitbeck, Simons, Conger, Lorenz, & Huck, 1991). In addition, a meta-analysis of this literature found a significant aggregated correlation between parent-child relationships and self-esteem when pooling across adolescence and young adulthood (r = .35); however, the strength of this effect declined with age as individuals presumably transitioned away from the family of origin (r = .40 in high school and .24 in young adulthood; Rice, 1990).

The clear and consistent relation between self-esteem and parent-child relationships found in cross-sectional studies is far less conclusive when examined longitudinally. The discrepancies are perhaps due to methodological differences across the studies (e.g., statistical models, measures, types of reporters, sample sizes). For example, the longitudinal research has assessed the parent-child relationship through observational reports of mother-child and father-child interactions (coded for autonomy and relatedness; Allen, Hauser, Bell, & O'Connor, 1994), parent report of responsiveness (Yang & Schaninger, 2010), and child report of parental

affection (Roberts & Bengtson, 1996). Sample sizes ranged from 77 to 3434, ages ranged from 10-14 at Time 1, participants were assessed between 1 and 20 years after the first assessment, and the number of time points ranged from 1-5. The studies primarily used the Rosenberg Self-Esteem Scale (Boudreault-Bouchard, et al., 2013; Deihl, Vicary, & Deike, 1997; Felson & Zielinski, 1989; Greene & Way, 2005; Roberts & Bengtson, 1996) with others using the Coopersmith Self-Esteem Inventory (Allen, Hauser, Bell, & O'Connor, 1994) or the General Self Subscale of the Self-Description Questionnaire (Yang & Schaninger, 2010). Thus, there is considerable variability in how this relation has been studied. Not surprisingly, results from longitudinal studies are inconsistent, such that the relation between the parent-child relationship and later self-esteem is zero in some studies, positive in others, and negative in others.

3.5.2 RESEARCH QUESTIONS AND AIMS OF THE STUDY

The goal of the present study is to provide a thorough test of the prospective relation of parent-child relationships on self-esteem. Critical differences across studies may be the reason why researchers have yet to reach consensus about whether parent-child closeness impacts later self-esteem. That is, there is inconsistency in (1) the way parenting is conceptualized across these studies (e.g., parental affection, mean family support), (2) the reporter of parent-child closeness, (3) the way the relation is modeled (e.g., ANCOVA, growth curve model), and (4) what is controlled for in the model (e.g., friendship support, parental monitoring; different demographics). These differences may have led to inconsistent findings in the extant literature. We address this issue in the current study by using a comprehensive set of both classic and more contemporary longitudinal models that evaluate dynamic connections between self-esteem and parent-child closeness in two different samples that used very similar methodology.

Study A is based on a sample of German adolescents followed from age 12 to 16 and self-reported parent-child closeness. Study B is based on a sample of American adolescents followed from age 13 to 16 and self-, parent-, and observer-reported parent-child closeness. Self-reported self-esteem using the Rosenberg Self-Esteem scale is used in both studies, and parent-child closeness is conceptualized as high in trust, low in avoidance, and having quality time with shared experiences in both studies. In addition, we examine whether the relation between parenting and self-esteem is spurious by testing whether controls for conceptually relevant third variables reduces the cross-sectional correlation between parent-child closeness and self-esteem in Study B.

3.5.3 METHODS

First, we present correlations between self-esteem and parent closeness at each wave and across each interval to show that the robust cross-sectional relation between parent-child closeness and self-esteem replicates in both studies. These correlations do not imply any type of temporal sequences between the two processes. To address that issue, we tested six longitudinal models: regressions, cross-lag models with latent variables, latent growth curve models, growth mixture models, latent difference score models, and enduring effects vs. revisionist models. Below is an overview of these models. Only the best fitting models are discussed in the Results. Given the sample sizes and the number of statistical tests conducted, we used a cutoff of $p < .01$ to determine significance throughout the paper.

The most basic test of the prospective effect of closeness on self-esteem is to use regression to predict later self-esteem scores from previous levels of closeness, controlling for previous self-esteem. We begin with this approach and then use latent variable structural models that

conceptualize change in different ways and to address concerns with measurement error. Prior to testing the five latent variable models, we tested for longitudinal measurement invariance of the models and found evidence for strong measurement invariance for both self-esteem and parenting (i.e., equal factor loadings and equal intercepts over time). Across all of the models we used this final invariant model as our base model. We then tested a series of models with increasing constraints. We used a cutoff of greater than .01 change in CFI and/or RMSEA to determine substantive decrease in model fit (see Cheung & Rensvold, 1999, 2002; Yap et al., in press), with one exception: the parenting invariance models showed that weak invariance fit better than strong invariance. However, we chose to retain strong invariance in this specification to be consistent across all models. Moreover, some of the weak invariant models (e.g., cross-lag, growth curve with the weak invariance parenting model) failed to converge. One possibility for this could be the large number of parameters in the weak invariance model.

Autoregressive cross-lagged regression. We began by fitting an autoregressive cross-lag model, which tests predictive relations while controlling for previous levels of the outcome and tests the direction of the relation between the parent-child relationship and self-esteem.

Latent growth curve model. The latent growth curve model tests the association between the parent-child relationship and self-esteem longitudinal trajectories. To examine possible nonlinearities in the changes over time, we used a latent growth approach in which we only estimated some of the slope loadings. In particular, we set the initial slope loading to zero and the last slope loading to one. We then allowed the loadings in-between those fixed values to be freely estimated. One controversy with this model pertains to the estimation of the cross-paths. Given that we want to test whether parent-child closeness will predict change over time in self-esteem, we are particularly interested in the cross-paths. To test this, we set the intercept to be

at age 12 (Study A) and age 13 (Study B). These intercepts do not reflect a true zero point. Instead, they represent a transition point in which many changes are occurring and thus a reasonable starting point for studying the effect of parent-child relationships on adolescent self-esteem. However, we acknowledge that this intercept does not represent the beginning of the relationship between parent-child closeness and self-esteem.

Growth mixture modeling. We tested whether there were different patterns of growth for subgroups of adolescents. That is, it could be that some adolescents increase in self-esteem, others decrease, and still others show no change across time; this incidence could potentially confound any test of self-esteem change from a single predictor (e.g., parent closeness). To test this possibility, we conducted a growth mixture model analysis, which tests for unknown groups of a continuous variable, similar to the way exploratory factor analysis tests for factors.

Latent difference score model. The latent difference score model, examines changes in two processes over time as well as the lead-lag relations between them, identifying sequences from one variable at a given occasion on subsequent changes in the other variable. For example, the LDS model can uncover the relation from parent-child closeness at a time *t* on changes in self-esteem at a next time *t* + 1 (McArdle, 2009; Ferrer & McArdle, 2010). Rather than examining change in terms of the rank-order of self-esteem (as in the cross-lagged model), the LDS model can predict changes in levels of self-esteem (i.e., difference scores; Ferrer & McArdle, 2003).

Enduring effects vs. revisionist model. This model proposes that there are two main ways that prior experiences may influence later outcomes. The first is called the *enduring effects* model, which suggests that a construct at one point in development can have a concurrent relationship with another construct that then persists at all subsequent times. In other words, this enduring effects model would suggest that the initial level of closeness would be correlated

with the initial level of adolescent self-esteem, and the initial level of closeness would have a lasting impact on all later assessments of self-esteem. On the other hand, the *revisionist* model suggests that a construct at one point in development can have a concurrent relationship with another construct, but the relation dissipates across development. That is, initial levels of closeness may be correlated with initial levels of self-esteem and may impact later self-esteem indirectly through its stability over time, but there is no direct effect to later self-esteem.

3.5.3.1 PARTICIPANTS AND PROCEDURES (STUDY A: GERMANY)

Data came from a study of youth followed from ages 12 to 16 conducted in Germany with annual waves from 1979 to 1983 (for details see Fend, 1990; 1994; see also Steiger et al., 2014). The first measurement wave was initiated when adolescents had a mean age of 12 years (n = 2,054). Students in Germany are allocated to different schools based on their school performance at the age of 10. In order to gain a representative sample of all students, schools were chosen according to the representative percentage of students within each school level in Germany. Each year, around 250 students were lost due to relocation of families, sickness or because some students had to repeat a school term. However, a similar number of students were gained for some of the same reasons (Fend, 1994; T2: n = 2047; T3: n = 2003; T4: n = 1952; T5: n = 1790). 851 of all participants completed standardized questionnaires at all five measurement occasions. 76.1% of the participants lived in a household with both parents, 14.3% of all parents were separated or divorced. 12.1% of the participants lived with a single mother, and 4.9% lived with a single father. 36.2% of all mothers were housewives, 22% worked full-time, 28.5% worked part-time and 12.8% worked from time to time by the hour. 8.4% of all participants were of other than German background (for details see Fend, 1990;

1994). For the subsequent analyses, sample sizes for individuals with data on both self-esteem and parent closeness are, T1: *n* = 982; T2: *n* = 1129, T3: *n* = 1079, T4: *n* = 1101, T5: *n* = 96.

3.5.3.2 MEASURES (STUDY A: GERMANY)

Global self-esteem. Self-esteem in adolescence was measured yearly from age 12 to 16 years with eight items from the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965). Participants rated each item on a dichotomous scale (1 = *disagree*, 2 = *agree*). The items were summed to create a total score (potential range: 8 to 16) and then POMP scored (i.e., percentage of maximum possible; Cohen, Cohen, Aiken, & West, 1999) to facilitate comparison across studies. Participants who responded to fewer than four items were deleted out of the analyses. Missing items were filled with a mean score of the completed responses for participants who responded to four or more items. Kuder-Richardson (1937) reliability estimates (KR-20) ranged between .72 and .77 for the five measurement occasions. Global self-esteem was moderately stable over time in terms of year-to-year correlations (age 12 to 13: *r* = .58; age 13 to 14: *r* = .59; age 14 to 15: *r* = .63; age 15 to 16: *r* = .58). Means and standard deviations ranged from 69.29 (25.25) at age 12 to 74.93 (25.58) at age 16.

Parent closeness. Parent closeness was assessed yearly from age 12 to 16 years with eight items indicating how a child perceives each of their parents with regard to closeness, interest, attention and rejection. Items are "*My mom/dad is not really interested in what I think and feel*", "*I have the feeling I can talk to my mom/dad about everything*", "*My mom/dad often has other things to do when I want to be with them*", "*When I have problems, I'd rather keep them to myself than tell my mom/dad",* "*My mom/dad always listens attentively when I want to tell him/her something*", "*Between my mom/dad and me, there are a lot of fights*", "*My mom/dad*

shows a lot of understanding for my problems" and "*My mom/dad doesn't really care much about me.*" Participants rated each item on a five-point Likert scale (1 = *totally disagree* to 5 = *totally agree*). The items were summed to create a total score (potential range: 8 to 40) and then POMP scored (Cohen, Cohen, Aiken, & West, 1999) to facilitate comparison across studies. Participants who responded to fewer than four items were excluded from the analyses. Missing items were filled with a mean score of the completed responses for participants who responded to four or more items. Cronbach's alpha reliability was high for all measurement occasions, α = .85 - .87. Means and standard deviations ranged from 67.48 (19.68) at age 12 to 64.18 (17.85) at age 16.

3.5.3.3 PARTICIPANTS AND PROCEDURES (STUDY B: USA)

The current sample consisted of 451 White parents and children living in rural Iowa in 1989. These families were a part of the Iowa Youth and Families Project (IYFP), an ongoing, longitudinal study that currently has 21 waves of data on four generations (now called Family Transitions Project, see Conger & Conger, 2002). Families were originally recruited by phone and in person from 34 public and private schools from eight counties in North Central Iowa in communities of fewer than 6,501 people. Seventy-eight percent of the families eligible for the study agreed to participate. The current study uses survey and observational data from the first four waves of IYFP and thus some data are missing. Self- and parent-report data were collected when the target children were in the seventh (T1, n = 451), eighth (T2, n = 424), ninth (T3, n = 407), and tenth (T4, n = 403-404) grades. Observer-report data had the following sample sizes: T1: 446, T2: 420, T3: 406, and T4: 398.

Trained interviewers visited the homes of the families for approximately two hours on two occasions. For the first visit, families completed questionnaires focusing on individual characteristics. During the second visit, the researchers videotaped two structured family interaction tasks. The first task lasted 30 minutes and involved all four family members (father, mother, target, and sibling). Family members took turns reading and discussing cards that asked general questions about family life. The second task lasted 15 minutes and also included all four family members. Family members discussed and tried to resolve an issue they had previously identified as being problematic for their family. Independent observers later coded videos for study variables.

3.5.3.4 MEASURES (STUDY B: USA)

Global self-esteem. Global self-esteem was assessed with ten items from the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965). Participants rated each item on a five-point scale (1 = *strongly disagree*, 5 = *strongly agree*). POMP scores (Cohen, Cohen, Aiken, & West, 1999) were created for all items, which were then averaged to create a composite score. Cronbach's alpha was high for all measurement occasions, α = .84 - .89. Global self-esteem was moderately stable over time in terms of year-to-year rank-order stability (age 12 to 13: r = .57; age 13 to 14: r = .67; age 14 to 15: r = .72). Means and standard deviations ranged from 73.74 (15.46) at age 13 to 74.35 (16.95) at age 16.

Parent closeness. Parent closeness was assessed with six items indicating how the adolescents perceived each of their parents with regard to closeness, attention, and rejection. Items were selected from study measures to match the German assessment of parent closeness. Example items for child report asked how often does one's mom/dad "*make you feel tense while*

you are around her/him," "*understand the way you feel about things*," and "*make you feel s/he really cares about you.*" Example items for parent report asked the extent to which each parent "*experiences strong feelings of love for his/her child*," "*is satisfied with his/her relationship with his/her child*," and "*really trusts his/her child.*" Participants rated each item on a four- or five-point Likert scale (1 = *strongly disagree*, 4/5 = *strongly agree*). POMP scores (Cohen, Cohen, Aiken, & West, 1999) were created for all items, which were then averaged to create composite scores about mothers and fathers. There were no differences in findings for mothers vs. fathers. Therefore, mother and father reports were averaged to create composite parent closeness scores. Cronbach's alpha was high for all measurement occasions, α = .81 - .86 for child report; α = .84 - .90 for parent report. Means and standard deviations ranged from 76.04 (14.46) at age 13 to 67.16 (16.08) at age 16 for child report and from 80.73 (10.74) at age 13 to 80.38 (12.73) at age 16 for parent report. Child-reported closeness to parents correlated with concurrent parent-reported closeness to children between .27 and .36 across the four waves.

Observed parent closeness was coded from previously recorded interactions as described above. Scales were created from the average scores of observer rating of mother and father variables, consistent with previous research (e.g., Conger, Cui, Bryant, & Elder, 2000). The following variables were used from task 1: positive communication, positive assertiveness, prosocial, warmth/support, responsiveness, encourages independence, inconsistent discipline, harsh discipline, indulgent-permissive, quality time, monitoring, positive reinforcement, consistent discipline, parent influence, and inductive reasoning. The following variables were used from task 2: *hostility*, or the extent to which hostile, angry, critical, disapproving, or rejecting behavior is directed toward another interactor's behavior, actions, appearance, or personal characteristics, *antisocial*, or demonstrations of self-centered, egocentric, acting out,

and out-of-control behavior that show defiance, active resistance, insensitivity toward others, and lack of constraint, immaturity, age-inappropriate behaviors, and *angry coercion*, or control attempts that include hostile, threatening, or blaming behavior. Cronbach's alphas were high for all measurement occasions, α = .81 - .88. Means and standard deviations ranged from 60.90 (11.18) at age 13 to 51.17 (9.43) at age 16. Observer-rated closeness correlated to concurrent child-reported closeness between .20 and .27, and to concurrent parent-reported closeness between .30 and .41 across the four waves.

3.5.4 RESULTS

3.5.4.1 RESULTS OF STUDY A (GERMANY)

We replicated previous research showing that self-esteem and closeness are consistently positively correlated across ages and time lags. The correlations ranged from .22 to .36 (*M* = .29, *SD* = .04). The mean and standard deviation were calculated using *z*-scored correlations and then translated back to *r*'s.

Regression. Results from regression analyses showed that although all but one of the coefficients were significant, the standardized effect sizes were relatively small, ranging from .07 to .14 for the effect of closeness on self-esteem and ranging from .02 to .13 for the effect of self-esteem on closeness. Regressions based on child report for mother and father separately revealed similar results. We also tested parent closeness by gender interactions for all three equations (composite parent, mother, and father ratings). Interactions did not explain a significant amount of the variance in self-esteem and will not be discussed further.

Autoregressive cross-lag model. We tested seven models that had increasing levels of constraints. Across all models, there was no reduction of model fit, therefore, we accepted the most parsimonious model (Model 7). For an overview of the final models, see Table 19.

The seven cross-lagged models (with increasing levels of constraints) tested are:

- Model 1: all parameters freely estimated (stabilities free, cross paths free)
- Model 2: within-construct constrained (Model 1 except stabilities equal)
- Model 3: cross-construct constrained (Model 2 except concurrent correlations equal)
- Model 4: within-construct constrained (Model 3 except cross paths equal)
- Model 5: cross-construct constrained (Model 4 except stabilities equal)
- Model 6: cross-construct constrained (Model 5 except cross paths equal)
- Model 7: cross-construct constrained (Model 6 except cross paths set to zero)

TABLE 11: CROSS-LAGGED MODELS OF STUDY A

Fit Indices and Parameter Estimates for Cross-Lagged Models (Study A)

	χ^2	*df*	CFI	RMSEA	(90% CI)	AIC	$\beta_{SE \rightarrow P}$[1]	$\beta_{P \rightarrow SE}$[1]
M1: All parameters free	596.99	149	.96	.04	(.04-.05)	186270.97	.03, .04, .04, .10*	.06, .08, -.01, .06
M2: Stabilities equal within constructs	607.94	155	.96	.04	(.04-.05)	186269.92	.06, .06, .04, .07	.01, .06, -.01, .09*
M3: Latent concurrent correlations equal	619.50	158	.96	.04	(.04-.05)	186275.48	.07, .07, .04, .06	.02, .07*, -.01, .08*
M4: Cross paths equal within constructs	626.77	164	.96	.04	(.04-.05)	186270.75	.06*	.04*
M5: All stabilities equal	631.11	165	.96	.04	(.04-.05)	186273.09	.04*	.06*
M6: All cross paths equal	631.12	166	.96	.04	(.04-.05)	186271.09	.04*	.06*
M7: All cross paths set to zero	654.03	167	.96	.04	(.04-.05)	186292.01	= 0	= 0

Note. Each model builds on the previous model (e.g., model 6 includes constraints listed in models 1 to 5). SE = self-esteem; P = parent closeness. $\beta_{P \rightarrow SE}$ = cross-paths from self-esteem to parent closeness. $\beta_{SE \rightarrow P}$ = cross-paths from parent closeness to self-esteem. [1]Equality constraints equate unstandardized coefficients. Because error variances are not equated over time, standardized paths may vary by approximately .01. *$p < .01$.

In Model 7, cross paths from parent closeness to self-esteem and from self-esteem to parent closeness were set to zero. Model 7 fit the data well and showed no support for a longitudinal relation between parent closeness and self-esteem. Across all models, self-esteem and closeness showed high stability (βs ranged from .68 to .88), perhaps explaining the fact that there was no evidence for cross-lagged effects in either direction.

Latent growth curve model. We tested four models that had increasing levels of constraints.

- Model 1: freely estimated model (latent correlations between all intercepts and slopes are free)
- Model 2: within-construct constrained model (correlation between each intercept and slope constrained to be equal)
- Model 3: cross-construct constrained model (two cross-paths from intercept to slope constrained to be equal)
- Model 4: cross-construct constrained model (two cross-paths from intercept to slope set to zero)

Across all models, there was no reduction of model fit; therefore, we accepted the most parsimonious model (Model 4).

The slope of self-esteem was positive and significantly different from zero (B = 5.17, β = .35, p = .00), and had significant variance (Φ = 214.59, p = .00). Thus, self-esteem, on average, increased yearly across adolescence, and there were individual differences in the amount of change. For closeness, there was a significant decreasing slope (B = -7.09, β = -.63, p = .00), and significant variance (Φ = 126.20, p = .00).

In Model 4, the cross-paths from the intercept of each construct to the slope of the other construct were set to zero. Model 4 fit the data well and thus shows no support for a longitudinal relation between parent closeness and self-esteem. Consistent with the robust cross-sectional

results, the intercepts of parent closeness and self-esteem were correlated (r = .43, p = .00). However, there was no evidence that slopes were related (r = .19, *ns*) in the final model.

TABLE 12: LATENT GROWTH CURVE MODELS OF STUDY A

Fit Indices and Parameter Estimates for Latent Growth Curve Models (Study A)

	$\chi 2$	df	CFI	RMSEA	(90% CI)	AIC	i1<-->s1	i2<-->s2	i1<-->s2	i2<-->s1	i1<-->i2	s1<-->s2
Bivariate (all free)	622.85	160	.96	.04	.04-.05	186274.83	-.34*	-.45*	-.23*	-.31*	.55*	.56*
Bivariate (within equal)	622.88	161	.96	.04	.04-.05	186272.86	-.35*	-.44*	-.23*	-.31*	.55*	56*
Bivariate (cross paths equal)	624.98	162	.96	.04	.04-.05	186272.96	-.34*	-.44*	-.29*	-.25*	.56*	.56*
Bivariate (cross paths @0)	649.64	163	.96	.04	.04-.05	186295.62	-.28*	-.38*	= 0	= 0	.43*	0.19

Note. AIC = Akaike Information Criterion. i1 = Self-esteem intercept, s1= Self-esteem slope, i2 = Parent closeness intercept, s2 = Parent closeness slope

Growth mixture model. Of three models, we found that a two-group solution fit the data best (i.e., AIC/BIC was lower), but only 4% of the sample were in the second group. Therefore, we concluded that growth in self-esteem is best modeled by a single group trajectory.

Latent difference score model. We fit seven LDS models with increasing constraints. The models tested are:

- Model 1: freely estimated (levels to changes free, changes to changes free)
- Model 2: cross-construct constrained (Model 1 except self-esteem changes to closeness changes equal and closeness changes to self-esteem changes equal)
- Model 3: cross-construct constrained (Model 2 except self-esteem levels to closeness changes equal and closeness levels to self-esteem changes equal)
- Model 4: cross-construct constrained (Model 3 except self-esteem levels to changes in closeness set to zero)
- Model 5: cross-construct constrained (Model 4 except closeness levels to changes in self-esteem set to zero)
- Models 6: cross-construct constrained (Model 5 except self-esteem changes to closeness changes set to zero)
- Model 7: cross-construct constrained (Model 6 except closeness changes to self-esteem changes set to zero

Across the seven models, there was no reduction in fit; therefore, we accepted the most parsimonious model (Model 7), which fit the data well. Model 7 is the most parsimonious model and has all level to change and all change to change couplings set to equal zero, indicating that neither parent closeness levels nor changes in closeness were linked with changes in self-

esteem, and likewise, neither self-esteem levels nor changes were linked with changes in parent closeness.

TABLE 13 : LATENT DIFFERENCE SCORE MODELS OF STUDY A

Fit Indices and Parameter Estimates for Bivariate Latent Difference Score Models Fit to Child-Reported Parent Closeness and Self-Esteem (Study A)

Note. AIC = Akaike Information Criterion. SE = self-esteem; P = parent closeness. $B_{SEdiff \rightarrow P}$ = Unstandardized beta coefficients from levels of P to changes in SE. $B_{Pdiff \rightarrow SE}$ = Unstandardized beta coefficients from levels of SE to changes in P. $B_{SEdiff \rightarrow Pdiff}$ = Unstandardized beta coefficients from changes in P to changes in SE. $B_{Pdiff->SEdiff}$ = Unstandardized beta coefficients from changes in SE to changes in P. *$p < .01$.

	$\chi 2$	df	CFI	RMSEA	(90% CI)	AIC	$B_{SEdiff \rightarrow P}$	$B_{Pdiff \rightarrow SE}$	$B_{SEdiff \rightarrow Pdiff}$	$B_{Pdiff->SEdiff}$
M1: All couplings free	659.29	158	.96	.05	(.04-.05)	186315.26	-.10*, -.14*, -.22*, -.35*	-.10, .10*, .21*, .57*	-.26*, -.53*, -.76*	.86*, 1.83*, 2.06*
M2: Equal couplings change on change	607.04	162	.96	.04	(.04-.05)	186255.02	-.14, -.21*, -.27*, -.28*	-.02, -.04, -.13*, -.07	0.11	0.06
M3: Equal couplings change on level	632.34	168	.96	.04	(.04-.05)	186268.32	-.21*	-.06	0.16	0.08
M4: P change → SE level couplings set to 0	635.69	169	.96	.04	(.04-.05)	186269.67	-.17*	= 0	0.17	0.09
M5: SE change → P level couplings set to 0	652.07	170	.96	.04	(.04-.05)	186384.04	= 0	= 0	0.17	0.07
M6: P level → SE level couplings set to 0	654.1	171	.96	.04	(.04-.05)	186284.07	= 0	= 0	0.16	= 0
M7: All couplings set to 0	658.95	172	.96	.04	(.04-.05)	186286.93	= 0	= 0	= 0	= 0

Enduring effects vs. revisionist model. The analyses thus far have shown a robust concurrent relation between closeness and self-esteem, but weak to non-existent longitudinal relation. This pattern is reminiscent of the revisionist model proposed by Fraley et al. (2012). Thus, we conducted one last analysis to further probe the longitudinal relation from parent-child closeness to self-esteem. We expected a revisionist model would fit the data the best because concurrent correlations are high, but the longitudinal effects show no relation. We tested seven models that had increasing levels of constraints.

We tested seven models with varying levels of constraints:

- Model 1: freely estimated, enduring effects (concurrent closeness to self-esteem free, initial closeness to subsequent self-esteem free)
- Model 2: cross-construct constrained, enduring effects (Model 1 except initial closeness to subsequent self-esteem equal)
- Model 3: freely estimated, revisionist (Model 1 except initial closeness to subsequent self-esteem set to zero)
- Model 4: freely estimated, transactional (Model 3 plus self-esteem second-order stabilities free)
- Model 5: freely estimated, transactional (Model 4 plus closeness first-order stabilities free)
- Model 6: freely estimated, inclusive (Model 5 plus concurrent closeness to self-esteem at Times 2 through 5 free)
- Model 7: cross-construct constrained, inclusive (Model 6 except concurrent closeness to self-esteem equal across all waves)

Across the seven models, there was no reduction in model fit, but not all of the models were nested, so we based our final decision on the AIC, which suggested that Model 7 was the best fitting model. Model 7 fit the data well, and indicates that after accounting for the relation between initial level of parent closeness and adolescent self-esteem (βs = .46, p = .00), self-esteem first-order stabilities (βs = .37 to .64, p = .00), self-esteem second-order stabilities (βs = .20 to .35, p = .00), and parent closeness first-order stabilities (βs = .73 to .88, p = .00), parent closeness continues to have a small, concurrent effect on self-esteem across adolescence (βs = .13 to .15, p = .00), but no prospective effect. This finding is consistent with the robust concurrent correlation between parenting and self-esteem, but again suggests this relation does not represent a prospective effect of parent closeness on change in self-esteem.

TABLE 14 : ENDURING EFFECTS VS. REVISIONIST MODELS OF STUDY 4A

Estimates of the Influence of Parent Closeness on Adolescent Self-Esteem (Study A)

	$\chi 2$	df	CFI	RMSEA	(90% CI)	AIC	$\beta_{SE1 \rightarrow P1}$	$\beta_{SE2, 3, 4, 5 \rightarrow P1}$	$\beta_{SE \rightarrow P \text{ concurrent}}$
M1: Enduring effects, free	665.60	151	.95	.05	(.04-.05)	186335.58	.50*	.10, .07, .08, .12*	-
M2: Enduring effects, equal	666.36	154	.96	.05	(.04-.05)	186330.33	.50*	.09*	-
M3: Revisionist	700.22	155	.96	.05	(.04-.05)	186362.19	.53*	-	-
M4: Transactional, 2nd-order stability for SE	620.93	152	.96	.05	(.04-.05)	186288.91	.53*	-	-
M5: Transactional, 1st-order stability for P	644.58	157	.96	.05	(.04-.05)	186302.56	.52*	-	-
M6: Inclusive, concurrent free	573.78	154	.96	.04	(.04-.05)	186237.76	.45*	-	.19*, .15*, .08, .14*
M7: Inclusive, concurrent equal	577.83	157	.96	.04	(.04-.05)	186235.80	.46*	-	.15*, .14*, .13*, .14*

Note. SE = self-esteem; P = parent closeness. $\beta_{SE1 \rightarrow P1}$ = Standardized beta coefficients from parent closeness to self-esteem at time 1. $\beta_{SE2, 3, 4, 5 \rightarrow P1}$ = Standardized beta coefficients from parent closeness at time 1 to self-esteem at times 2, 3, 4, and 5. $\beta_{SE \rightarrow P \text{ concurrent}}$ = Standardized beta coefficients from parent closeness to self-esteem at each subsequent, concurrent assessment (e.g., time 2 closeness to time 2 self-esteem).

*$p < .01$.

Results from Study A provide little evidence for a longitudinal connection between parent-child closeness and self-esteem. It is possible that the failure to find a relation is due to culture (e.g., factors other than parent-child closeness might have a more prominent impact on self-esteem in Germany), different levels of challenge during adolescence (e.g., German students have fewer school transitions than American students and therefore might not experience the same challenges that impact the parent-child relationship and the child's self-esteem), the measurement of self-esteem (only eight of the 10 RSE items were included in the study, and they were rated on a 0-1 scale; thus, a restricted range of scores might have attenuated the correlations), or who is reporting about the parent-child relationship (only child-report was available in Germany and perhaps the child's perception is less impactful than the parent's perception, which might be closer to reality). Study B addresses many of these limitations testing the longitudinal effect of parent-child closeness on child self-esteem using a United States sample, prior to a major life transition (the transition to high school), the full RSE rated on a 5-point Likert scale, and multiple raters of the parent-child relationship (child, parent, observational).

3.5.4.2 RESULTS OF STUDY B (USA)

Regression. Consistent with Study A, standardized effect sizes for regression equations ranged between .03 and .12, with only one showing a significant effect of child-reported closeness on self-esteem. For parent-reported closeness, effect sizes ranged between -.04 and .12, and for observer-reported closeness, effect sizes ranged between .01 and .08, none of which reached significance. Thus, there was little evidence for longitudinal relations between parent closeness (by any reporter) and adolescent self-esteem based on these regression analyses.

Regressions based on child report for mother and father separately revealed similar results. We also tested parent closeness by gender interactions for all three equations (composite parent, mother, and father ratings). Gender interactions did not explain a significant amount of the variance in self-esteem and will not be discussed further.

Autoregressive cross-lag model. We tested the same seven autoregressive cross-lag models as in Study A with increasing levels of constraints. We found that for each type of reporter, there was no reduction in model fit. Thus, we again chose the model with cross-paths between parent closeness and self-esteem set to zero (Model 7), which fit the data well for child-, parent-, and observer-report of parent closeness. Across all models and reporters, self-esteem and closeness again showed high stability (βs ranged from .67 to .81).

TABLE 15: FIT INDICES AND PARAMETER ESTIMATES FOR CROSS-LAGGED MODELS (STUDY B)

Fit Indices and Parameter Estimates for Cross-Lagged Models (Study B)

	χ^2	*df*	CFI	RMSEA	(90% CI)	AIC	$\beta_{SE \rightarrow P}$[1]	$\beta_{P \rightarrow SE}$[1]
Child report								
M1: All parameters free	611.25	236	.95	.06	(.05-.06)	79931.39	.02, .08, -.01	-.00, .07, .04
M2: Stabilities equal within constructs	624.75	240	.95	.06	(.05-.07)	79936.90	-.09, .10, .06	.07, .07, -.02
M3: Latent concurrent correlations equal	624.78	242	.95	.06	(.05-.07)	79932.93	-.09, .10, .06	.07, .07, -.02
M4: Cross paths equal within constructs	639.15	246	.95	.06	(.05-.07)	79939.29	.03, .04, .04	0.04
M5: All stabilities equal	641.89	247	.95	.06	(.05-.07)	79940.04	.01	.07*
M6: All cross paths equal	648.24	248	.95	.06	(.05-.07)	79944.39	.03, .04, .04	.03, .04, .03
M7: All cross paths set to zero	652.22	249	.95	.06	(.05-.07)	79946.37	= 0	= 0
Parent report								
M1: All parameters free	783.98	236	.93	.07	(.07-.08)	76690.34	.12, .04, -.05	-.06, .06, -.01
M2: Stabilities equal within constructs	811.48	240	.93	.07	(.07-.08)	76709.84	.02, .08, -.01	-.02, .02, -.01
M3: Latent concurrent correlations equal	817.79	242	.93	.07	(.07-.08)	76712.15	.01, .08, -.01	-.02, .03, -.00
M4: Cross paths equal within constructs	820.92	246	.93	.07	(.07-.08)	76707.28	0.03	.00
M5: Stabilities equal	832.95	247	.93	.07	(.07-.08)	76717.30	.00	.03
M6: Cross paths equal	833.73	248	.93	.07	(.07-.08)	76716.08	.01	.02
M7: Cross paths set to zero	835.05	249	.93	.07	(.07-.08)	76715.41	= 0	= 0

Observer report								
M1: All parameters free	597.53	236	.95	.06	(.05-.06)	76863.93	.08, .02, .03	.05, .03, .10
M2: Stabilities equal within constructs	618.54	240	.95	.06	(.05-.07)	76876.94	.05, .03, .04	.05, .04, .09
M3: Latent concurrent correlations equal	618.56	242	.95	.06	(.05-.06)	76872.96	.05, .03, .04	.05, .04, .09
M4: Cross paths equal within constructs	619.25	246	.95	.06	(.05-.06)	76865.65	.04	.05, .06, .06
M5: All stabilities equal	628.96	247	.94	.06	(.05-.06)	76873.36	.05, .06, .05	.04, .04, .05
M6: All cross paths equal	629.64	248	.95	.06	(.05-.06)	76872.04	.04*	.06*
M7: All cross paths set to zero	636.89	249	.94	.06	(.05-.06)	76877.29	= 0	= 0

Note. All χ^2 were significantly different from 0. $\beta_{P \rightarrow SE}$ = cross-paths from self-esteem to parent closeness. $\beta_{SE \rightarrow P}$ = cross-paths from parent closeness to self-esteem. [1]Equality constraints equate unstandardized coefficients. Because error variances are not equated over time, standardized paths may vary by approximately .01. *p < .01.

Latent growth curve model. The slope of self-esteem was not significantly different from zero (B = .58, β = .07, *ns*), but the variance was (Φ = 70.57, *p* = .00), indicating that adolescents varied in their trajectories of self-esteem. There was a significant decreasing slope of closeness for child report (B = -9.61, β = -1.10, *p* = .00), parent report (B = -1.68, β = -.25, *p* = .00), and observer report (B = -5.77, β = -1.06, *p* = .00), and there was significant variance around the slope of closeness for child report (Φ = 76.28, *p* = .00) and parent report (Φ = 44.80, *p* = .00), but not for observer report (Φ = 29.58, *ns*).

We tested the same four models as in Study A, with increasing levels of constraints. Across all models, there was no reduction in model fit for all reporters; therefore, we chose the most parsimonious model (Model 4) for all three types of reporters. As in Study A, the most parsimonious model is the bivariate latent growth curve model with cross paths between the intercept and slope of self-esteem and closeness set to zero. Model 4 fit the data well and provides no support for a longitudinal relation between parent closeness and self-esteem. Closeness intercepts were positively related to self-esteem intercepts for child report (*r* = .62, *p* = .00), parent report (*r* = .50, *p* = .00), and observer report (*r* = .22, *p* = .00). In addition, the self-esteem slope was positively related to the closeness slope for child report (*r* = .92, *p* = .00), but not for parent report (*r* = .26, *ns*), or observer report (*r* = .15, *ns*).

TABLE 16: LATENT GROWTH CURVE MODELS OF STUDY 4B

Fit Indices and Parameter Estimates for Latent Growth Curve Models (Study B)

	χ2	df	CFI	RMSEA	(90% CI)	AIC	i1<-->s1	i2<-->s2	i1<-->s2	i2<-->s1	i1<-->i2	s1<-->s2
Child report												
Bivariate (all free)	740.67	248	.93	.07	(.06-.07)	80036.82	-.22	-.06	-.26	-.23	.67*	1.03*
Bivariate (within equal)	741.17	249	.93	.07	(.06-.07)	80035.32	-.13	-.10	-.26	-.23	.69*	1.05*
Bivariate (cross paths equal)	741.17	250	.93	.07	(.06-.07)	80033.32	-.13	-.10	-.26*	-.23*	.69*	1.05*
Bivariate (cross paths @0)	749.32	251	.93	.06	(.06-.07)	80039.47	.05	.04	= 0	= 0	.62*	.92*
Parent report												
Bivariate (all free)	733.51	248	.94	.07	(.06-.07)	76615.87	.06	.09	-.14	.01	.52*	.32
Bivariate (within equal)	733.55	249	.94	.07	(.06-.07)	76613.9	.08	.07	-.14	.01	.51*	.32
Bivariate (cross paths equal)	735.16	250	.94	.07	(.06-.07)	76613.52	.09	.08	-.05	-.06	.52*	.31
Bivariate (cross paths @0)	735.62	251	.94	.07	(.06-.07)	76611.98	.11	.10	= 0	= 0	.50*	.26
Observer report												
Bivariate (all free)	614.44	248	.95	.06	(.05-.06)	76856.84	0.09	-.28*	-.04	.04	.23*	.12
Bivariate (within equal)	617.62	249	.95	.06	(.05-.06)	76858.02	-.14	-.23	-.08	.02	.22*	.19
Bivariate (cross paths equal)	618.19	250	.95	.06	(.05-.06)	76856.59	-.13	-.22	-.02	-.01	.23*	.17
Bivariate (cross paths @0)	618.22	251	.95	.06	(.05-.06)	76854.62	-.13	-.22	= 0	= 0	.22*	.15

Note. AIC = Akaike Information Criterion. i1 = Self-esteem Intercept, s1= Self-Esteem Slope, i2 = Parent Closeness Intercept, s2 = Parent Closeness Slope

Growth mixture model. We tested two models of one and two groups, respectively. The two-group model for self-esteem fit better than the single-group model (i.e., AIC/BIC was lower), but there was only one individual in the second group. Therefore, we chose the single-group model, which suggests that there are no subgroups of individuals regarding change patterns in self-esteem.

Latent difference score model. We fit the same seven LDS models as in Study A, with increasing constraints. There was no reduction in model fit across the seven models for any type of reporter. Thus, for all types of reporter, we chose Model 7 in which all level to change and all change to change couplings are set to equal zero, indicating that neither parent closeness levels nor changes in closeness were linked with changes in self-esteem, and likewise, neither self-esteem levels nor changes were linked with changes in parent closeness.

TABLE 17: LATENT DIFFERENCE SCORE MODELS OF STUDY B

Fit Indices and Parameter Estimates for Bivariate Latent Difference Score Models Fit to Child-Reported Parent Closeness and Self-Esteem

	$\chi 2$	df	CFI	RMSEA	(90% CI)	AIC	$B_{SEdiff \rightarrow P}$	$B_{Pdiff \rightarrow SE}$	$B_{SEdiff \rightarrow Pdiff}$	$B_{Pdiff \rightarrow SEdiff}$
Child report										
M1: All couplings free	641.19	246	.95	.06	(.05-.07)	79941.34	-.26*, -.11, -.13	-.36*, -.53*, -.69*	.30*, .56*	.07, .73*
M2: Equal couplings change on change	662.73	248	.94	.06	(.06-.07)	79958.88	-.25*, -.11, -.12	-.27*, -.39*, -.49*	.40*	0.20
M3: Equal couplings change on level	680.38	252	.94	.06	(.06-.07)	79968.53	-.08	-.41*	.36*	.24*
M4: P change -->SE level couplings set to 0	718.65	253	.94	.06	(.06-.07)	80004.79	-.02	= 0	.44*	0.17
M5: SE change -->P level couplings set to 0	718.82	254	.94	.06	(.06-.07)	80002.97	= 0	= 0	.43*	0.18
M6: P change -->SE change couplings @0	722.83	255	.94	.06	(.06-.07)	80004.97	= 0	= 0	.34*	= 0
M7: All couplings set to 0	729.82	256	.94	.06	(.06-.07)	80009.97	= 0	= 0	= 0	= 0
Parent report										
M1: All couplings free	744.83	246	.94	.07	(.06-.07)	76631.19	-.41*, -.29*, -.37*	-.07, -.06, -.06	.28, .02	.06, .26
M2: Equal couplings change on change	747.96	248	.94	.07	(.06-.07)	76630.32	-.43*, -.30*, -.38*	-.08, -.06, -.06	0.13	0.09
M3: Equal couplings change on level	751.2	252	.94	.07	(.06-.07)	76625.55	-.35*	-.07	0.19	0.07
M4: P change -->SE level couplings set to 0	754.26	253	.94	.07	(.06-.07)	76626.62	-.31*	= 0	0.13	0.04
M5: SE change -->P level couplings set to 0	766.53	254	.93	.07	(.06-.07)	76636.89	= 0	= 0	-.04	0.06
M6: P change -->SE change couplings @0	767.56	255	.93	.07	(.06-.07)	76635.92	= 0	= 0	-.04	= 0
M7: All couplings set to 0	767.49	255	.93	.07	(.06-.07)	76635.85	= 0	= 0	= 0	= 0

Observer report										
M1: All couplings free	634.24	246	.94	.06	(.05-.07)	76880.64	-.06, .10, .14	-.03, -.11, -.04	.52, .59*	-.01, .55
M2: Equal couplings change on change	640.91	248	.94	.06	(.05-.07)	76883.31	-.04, .05, .06	-.03, -.09, -.02	0.28	0.11
M3: Equal couplings change on level	643.93	252	.94	.06	(.05-.06)	76878.33	0.04	-.03	0.16	0.11
M4: P change -->SE level couplings set to 0	644.14	253	.94	.06	(.05-.06)	76876.54	0.05	= 0	0.15	0.10
M5: SE change -->P level couplings set to 0	645.02	254	.94	.06	(.05-.06)	76875.42	= 0	= 0	0.12	0.08
M6: P change -->SE change couplings @0	645.74	255	.94	.06	(.05-.06)	76874.14	= 0	= 0	0.09	= 0
M7: All couplings set to 0	647.02	256	.94	.06	(.05-.06)	76873.42	= 0	= 0	= 0	= 0

Note. AIC = Akaike Information Criterion. SE = self-esteem; P = parent closeness. $B_{SEdiff \rightarrow P}$ = Unstandardized beta coefficients from levels of P to changes in SE. $B_{Pdiff \rightarrow SE}$ = Unstandardized beta coefficients from levels of SE to changes in P. $B_{SEdiff \rightarrow Pdiff}$ = Unstandardized beta coefficients from changes in P to changes in SE. $B_{Pdiff->SEdiff}$ = Unstandardized beta coefficients from changes in SE to changes in P. *$p < .01$.

Enduring effects vs. revisionist model. We tested the same seven models as in Study A, with increasing levels of constraints and for each type of reporter. There was no reduction in model fit, but not all of the models were nested, so we based our final decision on the AIC, which suggested that Model 7 was the best fitting model for child report, whereas Model 4 fit the best for parent and observer report. Model 7 is an inclusive model with concurrent paths from closeness to self-esteem constrained to be equal and indicates that after accounting for the relation between initial level of child-reported parent closeness and adolescent self-esteem, self-esteem first-order stabilities, self-esteem second-order stabilities and parent closeness stabilities, parent closeness continues to have a small, concurrent relation with self-esteem across adolescence, but no prospective effect. Model 4 suggests that after accounting for self-esteem second-order stabilities, parent closeness as reported by parents and observers continues to have a strong, concurrent relation with self-esteem at age 13 and no prospective effects.

TABLE 18: ENDURING EFFECTS VS. REVISIONIST MODELS OF STUDY B

Estimates of the Influence of Parent Closeness on Adolescent Self-Esteem (Study B)

	$\chi 2$	*df*	CFI	RMSEA	(90% CI)	AIC	$\beta_{SE1 \rightarrow P1}$	$\beta_{SE2, 3, 4, 5 \rightarrow P1}$	$\beta_{SE \rightarrow P \text{ concurrent}}$
Child report									
M1: Enduring Effects (free)	767.96	245	.93	.07	(.06-.07)	80070.11	.53*	.08, .17*, .06	-
M2: Enduring Effects (equal)	770.73	247	.93	.07	(.06-.07)	80068.88	.53*	.12*, .11*, .10*	-
M3: Revisionist	787.15	248	.93	.07	(.06-.07)	80083.30	.54*	-	-
M4: Transactional (2nd-order stability for SE)	769.64	246	.93	.07	(.06-.07)	80069.78	.55*	-	-
M5: Transactional (1st-order stability for P)	751.41	248	.93	.07	(.06-.07)	80047.56	.54*	-	-
M6: Inclusive (concurrent free)	701.97	246	.94	.07	(.06-.07)	80002.11	.52*	-	.26*, .27*, .21*
M7: Inclusive (concurrent equal)	702.49	248	.94	.06	(.06-.07)	79998.63	.52*	-	.27*, .24*, .23*
Parent report									
M1: Enduring Effects (free)	735.06	245	.94	.07	(.06-.07)	76623.42	.53*	.16*, .17*, .01	-
M2: Enduring Effects (equal)	738.63	247	.94	.07	(.06-.07)	76622.99	.41*	.10*, .09*, .08*	-
M3: Revisionist	752.01	248	.94	.07	(.06-.07)	76634.37	.42*	-	-
M4: Transactional (2nd-order stability for SE)	735.27	246	.94	.07	(.06-.07)	76621.63	.42*	-	-
M5: Transactional (1st-order stability for P)	819.27	248	.93	.07	(.07-.08)	76701.63	.42*	-	-
M6: Inclusive (concurrent free)	796.94	246	.93	.07	(.07-.08)	76683.30	.40*	-	.15*, .16*, .00
M7: Inclusive (concurrent equal)	804.84	248	.93	.07	(.07-.08)	76687.20	.40*	-	.11*, .10*, .10*

Observer report									
M1: Enduring Effects (free)	598.52	245	.95	.06	(.05-.06)	76846.92	.15*	.07, .06, .03	-
M2: Enduring Effects (equal)	598.96	247	.95	.06	(.05-.06)	76843.36	.15*	.06, .05, .05	-
M3: Revisionist	604.29	248	.95	.06	(.05-.06)	76846.69	.16*	-	-
M4: Transactional (2nd-order stability for SE)	588.32	246	.95	.06	(.05-.06)	76834.72	.16*	-	-
M5: Transactional (1st-order stability for P)	632.40	248	.94	.06	(.05-.06)	76874.80	.16*	-	-
M6: Inclusive (concurrent free)	627.49	246	.95	.06	(.05-.06)	76873.89	.15*	-	.08, .04, .04
M7: Inclusive (concurrent equal)	627.75	248	.95	.06	(.05-.06)	76870.15	.15*	-	.06, .06, .05

Note. $\beta_{SE1 \rightarrow P1}$ = Standardized beta coefficients from parent closeness to self-esteem at time 1. $\beta_{SE2,\ 3,\ 4,\ 5 \rightarrow P1}$ = Standardized beta coefficients from parent closeness at time 1 to self-esteem at times 2, 3, 4, and 5. $\beta_{SE \rightarrow P\ concurrent}$ = Standardized beta coefficients from parent closeness to self-esteem at each subsequent, concurrent assessment (e.g., time 2 closeness to time 2 self-esteem). *$p < .01$.

Spurious correlation. Thus far we have found null effects with multiple longitudinal models that test whether parent closeness impacts the development of self-esteem across adolescence or vice versa. However, there is a robust, positive correlation between self-esteem and parent closeness both in our data and in the extant literature; therefore, the next step is to test whether this correlation represents a spurious relation. That is, whether an environmental, family, parent, or child characteristic can explain the relation between self-esteem and parent closeness. Based on theories of self-esteem we identified and tested several constructs within each of these categories. We first tested partial-correlations for each construct individually and then for all constructs simultaneously. We found that many of the constructs were concurrently related to self-esteem and parent closeness at each age. However, partial correlations revealed that no parent characteristics reduced the correlation by more than .02. Child characteristics were more strongly correlated with self-esteem and closeness, but still only accounted for a trivial amount of the correlation between closeness and self-esteem. Results replicated across the next three years of adolescence. Next, we tested whether controlling for all 17 constructs simultaneously would have a greater impact on the correlation between self-esteem and closeness. It did, but self-esteem was still moderately related to closeness, and the correlation only declined by .10 on average across the four waves. Finally, this relation held when controlling for prior self-esteem in addition to the 17 constructs (partial r = .23 to .31). Thus, the relation between self-esteem and closeness is not easily explained by the potential third variables we considered.

TABLE 19: FIT INDICES AND PARAMETER ESTIMATES FOR FINALS MODELS OF STUDY 4 (STUDY A & B)

Fit Indices and Parameter Estimates for Final Models

	Fit Indices						Parameter Estimates					
Study and informant	$\chi 2$	df	CFI	RMSEA	(90% CI)	AIC						
Cross-Lagged Models							$\beta_{SE \rightarrow P}$[1]		$\beta_{P \rightarrow SE}$[1]		-	-
1) Study A	654.03	167	.96	.04	(.04-.05)	186292.01	= 0		= 0		-	-
2) Study B child	652.22	249	.95	.06	(.05-.07)	79946.37	= 0		= 0		-	-
3) Study B parent	835.05	249	.93	.07	(.07-.08)	76715.41	= 0		= 0		-	-
4) Study B observer	636.89	249	.94	.06	(.05-.06)	76877.29	= 0		= 0		-	-
Latent Growth Curve Models							SE_i<-->SE_s	P_i<-->P_s	SE_i<-->P_s	P_i<-->SE_s	SE_i<-->P_i	SE_s<-->P_s
5) Study A	649.64	163	.96	.04	(.04-.05)	186295.62	-.28*	-.38*	= 0	= 0	.43*	.19
6) Study B child	749.32	251	.93	.06	(.06-.07)	80039.47	.05	.04	= 0	= 0	.62*	.92*
7) Study B parent	735.62	251	.94	.07	(.06-.07)	76611.98	.11	.10	= 0	= 0	.50*	.26
8) Study B observer	618.22	251	.95	.06	(.05-.06)	76854.62	-.13	-.22	= 0	= 0	.22*	.15
Latent Difference Score Models							$\beta_{SEdiff \rightarrow P}$		$\beta_{Pdiff \rightarrow SE}$		$\beta_{SEdiff \rightarrow Pdiff}$	$\beta_{Pdiff \rightarrow SEdiff}$
9) Study A	658.95	172	.96	.04	(.04-.05)	186286.93	= 0		= 0		= 0	= 0
10) Study B child	729.82	256	.94	.06	(.06-.07)	80009.97	= 0		= 0		= 0	= 0
11) Study B parent	767.49	255	.93	.07	(.06-.07)	76635.85	= 0		= 0		= 0	= 0
12) Study B observer	647.02	256	.94	.06	(.05-.06)	76873.42	= 0		= 0		= 0	= 0
Revisionist vs. Enduring Effects Models							-		$\beta_{SE1 \rightarrow P1}$		$\beta_{SE \rightarrow P \text{ concurrent}}$	
13) Study A	577.83	157	.96	.04	(.04-.05)	186235.80	-		.46*		.15*, .14*, .13*, .14*	
14) Study B child	702.49	248	.94	.06	(.06-.07)	79998.63	-		.52*		.27*, .24*, .23*	
15) Study B parent	804.84	248	.93	.07	(.07-.08)	76687.20	-		.40*		.11*, .10*, .10*	
16) Study B observer	627.75	248	.95	.06	(.05-.06)	76870.15	-		.15*		.06, .06, .05	

Note. AIC = Akaike Information Criterion. SE = self-esteem; P = parent closeness. $\beta_{P \rightarrow SE}$ = cross-paths from SE to P. $\beta_{SE \rightarrow P}$ = cross-paths from P to SE. [1]Equality constraints equate unstandardized coefficients. Because error variances are not equated over time, standardized paths may vary by approximately .01. SE_i = SE intercept. SE_s = SE slope. P_i = P intercept. P_s β P slope. $\beta_{SE1 \rightarrow P1}$ = Standardized beta coefficients from P to SE at time 1. $\beta_{SE2,\ 3,\ 4,\ 5 \rightarrow P1}$ = Standardized beta coefficients from P at time 1 to SE at times 2, 3, 4, and 5. $\beta_{P \rightarrow SE\ concurrent}$ = Standardized beta coefficients from P to SE at each subsequent, concurrent assessment. $B_{SEdiff \rightarrow P}$ = Unstandardized beta coefficients from levels of P to changes in SE. $B_{Pdiff \rightarrow SE}$ = Unstandardized beta coefficients from levels of SE to changes in P. $B_{SEdiff \rightarrow\ Pdiff}$ = Unstandardized beta coefficients from changes in P to changes in SE. $B_{Pdiff\text{->}SEdiff}$ = Unstandardized beta coefficients from changes in SE to changes in P. *p < .01.

TABLE 20: ZERO-ORDER CORRELATIONS OF THIRD VARIABLES AND SELF-ESTEEM/PARENT CLOSENESS OF STUDY

Third Variable	Self-Esteem	Parent Closeness	Partial Correlation between self-esteem and parent closeness, controlling for third variable
	Target child behavior		
School problems	-.19*	-.21*	.43*
Conduct disorder	-.30*	-.23*	.41*
	Target child personality and psychopathology		
Target neuroticism	.23*	.09	.45*
Target anxiety	-.40*	-.28*	.39*
Target depression	-.47*	-.32*	.36*
Target hostility	-.38*	-.32*	.38*
	Parent personality and psychopathology		
Parent self-esteem	.20*	.05	.45*
Parent positive affect	.23*	.12*	.44*
Parent depression	-.20*	-.07	.45*
Parent anxiety	-.15*	-.06	.45*
Parent hostility	-.20*	-.09	.45*
Parent agreeableness	.04	.10*	.45*
Parent neuroticism	-.21*	-.08	.45*
Parent conscientiousness	.12*	.02	.45*
	Parent thoughts and feelings		
Parent positive emotion	.10*	.10*	.45*
Parent authoritarian values	-.14*	-.01	.46*
Parent vulnerability	-.03	-.09	.45*
All simultaneous			.34*

Note: $*p < .05$. Raw correlation between self-esteem and parent closeness = .45*. Zero-Order Correlations Between Potential Third Variables and Self-Esteem/Parent Closeness, and Partial Correlations Between Self-Esteem and Parent Closeness, Controlling for Potential Third Variables at Age 13 (Study B)

3.5.5 DISCUSSION

The present study sought to evaluate the connection between parent-child closeness and adolescent self-esteem. Previous research has shown a pervasive, concurrent relation between the parent-child relationship and self-esteem (e.g., Barber, Chadwick, & Oerter, 1992; Rice, 1990; Verschueren, Marcoen, & Schoefs, 1996; Whitbeck, Simons, Conger, Lorenz, & Huck, 1991), whereas the existing longitudinal evidence is less conclusive. Thus, we specified a wide range of longitudinal models designed to capture dynamic associations between parenting variables and global self-esteem. We conducted the same longitudinal analyses in two samples – one from Germany and one from the United States – to potentially identify generalizable findings.

Overall, we found a robust, cross-sectional correlation between parent-child closeness and self-esteem. Effects replicated across samples and across waves. Thus, our results were consistent with previous cross-sectional studies. Despite this robust concurrent relation, we found little support for a dynamic connection between self-esteem and parent-child relationships using six different longitudinal models. These null results are somewhat surprising in light of a large body of literature suggesting that the relationship with parents, especially feeling one's parents love and support you, plays an important role in the development of global self-esteem. We started with the most basic analyses, regression equations controlling for previous self-esteem, and progressed to more complicated models. Across the models, we failed to find evidence for a prospective effect. The one exception was that we found support for correlated changes in parent closeness and self-esteem; however, we only found this with the sample from the United States and only when using adolescent self-reported parent closeness. Correlated changes were not found in the German sample or in the United States sample when parent closeness was reported by the parents or based on observer ratings. These results could

mean that perceptions of closeness are the more significant psychological contributor to the development of self-esteem. Alternatively, shared method biases or Type I errors could serve as plausible explanations.

Despite these null results, there were interesting results in terms of patterns of stability and change for self-esteem and parent-child closeness. For instance, we found replicable evidence for average declines in parent closeness (i.e., negative slopes in both samples as reported by adolescents, as well as in the United States sample when reported by parents and observers). This supports the idea of changes in parent-child relationships during adolescence along the lines of reorganization and increasing autonomy and thus a potential distancing from parents. In terms of self-esteem, adolescents tended to report an overall increase in self-esteem (as in Study A) or no average change (as in Study B). Thus, we found no evidence for major declines in self-esteem during adolescence. However, in both studies, there was significant variance around the slopes of self-esteem, indicating that there were individual differences in trajectories for both samples.

It is also important to emphasize that we replicated previous cross-sectional results in two samples and with multiple methods in Study B. Thus, we have no reason to believe that the cross-sectional association is somehow an artifact. Moreover, we conducted a series of analyses designed to evaluate possible "third variable" explanations for the connection between self-esteem and parent-child closeness and were unsuccessful. In other words, we were unable to "break" the cross-sectional association despite our best efforts. This suggests that parents are likely to be a source of self-esteem for individuals but that parent-child closeness is unlikely to be a strong correlate of changes in self-esteem during adolescence. This is the type of situation that the enduring effects versus revisionist models were developed to test. That is, some

developmental processes may operate in a fashion in which an early life relationship or event has a significant impact on an outcome and continues to have an impact through the stability of the outcome over time. More studies examining the longitudinal relation of parenting and self-esteem earlier in the life span and examining other third variable explanations can help inform this revisionist model of parent influences on self-esteem.

In sum, there is a robust relation between concurrent parent closeness and self-esteem, but this relation has proved difficult to explain. It does not represent a process by which parent closeness leads to differences in the development of self-esteem or a process by which self-esteem leads to differences in the growth of parent closeness, and it does not appear to be a spurious relation based on the limited set of constructs tested in the present research. What is clear is that the longitudinal effect of parent closeness on self-esteem is, at best, small and therefore difficult to detect with the sample sizes used in the current study.

3.5.5.1 STRENGTHS AND LIMITATIONS

A major advance of the present research is that we tested the same conceptualization of parenting across all models and reporters, but this is also a limitation because it excludes the test of other characteristics of the parent-child relationship that may be important for changes in self-esteem. Overall, there were very weak longitudinal relations between parent closeness (defined as perceived attachment, conflict, warmth, trust, support, affection, or responsiveness) and adolescent self-esteem. Parent-child closeness was selected because of theories regarding the importance of parents for self-esteem development (see Sroufe, 2002; Rosenberg, 1965; Coopersmith; 1967), but there could be other types of parenting that are important for changes in self-esteem across adolescence (e.g., criticism from parents as in Felson & Zielinski, 1989).

However, we have followed up the current analyses by testing regression models using eight additional types of parenting (i.e., communication, harsh discipline, inconsistent discipline, hostility, induction, monitoring, problem solving, and warmth) in the United States sample and found only modest and inconsistent effects on self-esteem change in adolescence (β range = -.07 to .12). This is perhaps unsurprising given these different parenting scales are moderately related to each other (range r = .26 to .77) and thus might not be tapping unique aspects of the parent-child relationship.

There are also additional caveats that should be considered. For example, we acknowledge that our test of third variable explanations was selective and by no means exhaustive. In addition to other family, environmental, and personal third variables, shared genetic origins could account for the relation between parent closeness and self-esteem. On the other hand, our list of variables were motivated by the existing literature. It is also important to consider that we investigated the adolescent period because there is less controversy over the assessment of global self-esteem during this period of the life span and because we suspected that parent-child dynamics would be changing as the child traverses the adolescent years and the related challenges. We found evidence that parent-child closeness changed in ways that were consistent with our expectations. However, there was still a considerable degree of rank-order consistency in parent-child relationships as well as self-esteem. Thus, it is possible that there is a relatively enduring dynamic between parents and children that is largely established prior to early adolescence. Thus, larger and more robust effects might be found during early childhood when children are forming their first self-evaluations. Therefore, an interesting area for future research could be to examine the longitudinal effect of parent-child relationships on emerging self-evaluations of young children.

Last, we acknowledge that parents are but one potential factor related to the development of self-esteem. Future research should examine the longitudinal relations between positive peer relationships and changes in self-esteem. Peers become an increasingly more important social factor during adolescence and serve as significant social relationships to adolescents. Thus, support in peer relationships might be a more impactful factor in self-esteem development during adolescence. However, given that adolescent peer groups rapidly fluctuate (i.e., shift from middle to high school; changing classmates every semester) it could be the case that only current peer relationships predict short-term changes in self-esteem. Furthermore, it could be the case that peer relationships interact with parent relationships to impact self-esteem over time (see Skogbrott Birkeland, Breivik, & Wold, 2013). Thus, an intriguing area of future research will be to continue to test the importance of peer relationships for longitudinal trajectories of self-esteem in adolescence.

In conclusion, the current study extends existing literature by providing a comprehensive test of the hypothesis that parent-child closeness has a prospective impact on adolescent self-esteem. The few studies that have tested this link have provided inconsistent findings. We found little evidence for prospective associations using a variety of longitudinal models applied to two different datasets. Likewise, we found no evidence that self-esteem has a prospective association with closeness. However, correlations within and across time lags support theory and research that suggests that parent closeness is consistently correlated with adolescent self-esteem, and we were not able to explain this away by testing a variety of third variable explanations. Three potential areas for future research are to test whether: (1) the relation between parent-child closeness can be explained by common genetic influences, (2) a prospective relation can be found at younger ages, and (3) peer relationships contribute to self-

esteem development. Such studies may shed additional light on the developmental antecedents of self-esteem.

4 GENERAL DISCUSSION

4.1 SUMMARY OF STUDY 1

Self-esteem has been shown to be an important predictor of a number of life outcomes and is especially powerful in the prediction of depression. However, self-esteem is not an entirely stable construct but changes over time with a considerable mean-level drop and low rank-order consistency during adolescence compared to other age periods. Because adolescence is conceptualized as a malleable age period, not only level but also change in self-esteem were hypothesized to predict depression in adulthood. Results from Study 1 using latent growth curve analyses demonstrated that both level and change in self-esteem served as predictors for adult depression. Individuals who entered adolescence with low self-esteem, and/or whose self-esteem declined further during the adolescent years were more likely to exhibit symptoms of depression two decades later as adults, independent of initial self-esteem level. This pattern held both for global and domain-specific self-esteem. These findings highlight the importance of adolescent self-esteem development for mental health outcomes in adulthood.

4.2 SUMMARY OF STUDY 2

Whereas Study 1 was concerned with indicators of adolescent development that referred to the self (self-esteem of academic competence, physical attractiveness and global self-worth), Study 2 shifts the focus from the self to competencies relevant for the social world around the developing adolescent. That is, this study explored the predictive influence of empathy development in adolescence on self-reported social competencies and outcomes in adulthood. Empathy tended to increase during the adolescent years, however, significant interindividual

differences in level and change of adolescent empathy were found. Gender was related to level of adolescent empathy favoring girls over boys. Again and most importantly, not only level but also change in adolescent empathy predicted individual differences in social competencies in adulthood two decades later. These findings, together with the results of Study 1, demonstrate that developmental processes that are relevant for adolescent adjustment reveal long-term consequences beyond the adolescent years.

4.3 SUMMARY OF STUDY 3

Study 3 ties in with the findings of Study 1 by testing the scope of the findings found in the first study. The focus lay on the longitudinal (three decades) and on the intergenerational scope of the effect of self-esteem and depression. Furthermore, diverging models on the relation between self-esteem and depression were tested against each other. The vulnerability model states that low self-esteem functions as a predictor for the development of depression whereas the scar model assumes that depression leaves scars in individuals resulting in lower self-esteem. Both models have received empirical support, however, they have only been tested *within* individuals and not *across generations* (i.e., between family members). This study therefore tested the scope of these competing models by (a) investigating whether the effects hold from adolescence to middle adulthood (long-term vulnerability and scar effects), (b) whether the effects hold across generations (intergenerational vulnerability and scar effects) and (c) whether intergenerational effects are mediated by parental self-esteem and depressive symptoms and parent-child discord. Longitudinal data from adolescence to middle adulthood (N = 1,359) and from Generation 1 adolescents (G1) to Generation 2 adolescents (G2) (N = 572 parent-child pairs) were used to test these models. Results from latent cross-

lagged regression analyses demonstrated that both adolescent self-esteem and depressive symptoms were prospectively related to adult self-esteem and depressive symptoms three decades later. That is, both the vulnerability and scar models are valid over decades with stronger effects for the vulnerability model. Across generations, a substantial direct transmission effect from G1 to G2 *adolescent* depressive symptoms but no evidence for the proposed intergenerational vulnerability and scar effect nor for any of the proposed mediating mechanisms were found. Therefore, depressive symptoms must be regarded as long-term risk factors both for the individual him-/herself and for the next generation. Low self-esteem, on the other hand, must be regarded as an *individual* risk factor "only", with no risk for the next generation.

4.4 SUMMARY OF STUDY 4

In Study 4, antecedents of positive adolescent development were examined. Whereas studies 1 to 3 were concerned with the outcomes of positive or negative adolescent development, the last study focused on predictors of the adolescent developmental process. Global self-esteem is thought to stem at least partly from parent-child relationships. Cross-sectional research supports this hypothesis, but longitudinal studies lack robust prospective effects. Self, parent, and observer reports of parent-child closeness and self-reported self-esteem from ages 12-16 and from two data sets (German LifE-Study and American Iowa-Study) were used to test the longitudinal relations between these constructs. Results replicated the concurrent correlation, but six types of longitudinal models failed to show prospective relations. Thus, the longitudinal effect of parent closeness on self-esteem is, at best, small and difficult to

detect. These findings call into question the purported prospective impact of parent-child relationships on self-esteem during the adolescent years.

4.5 OVERALL DISCUSSION

Common to the studies presented in the present PhD thesis is the view that (a) earlier stages in life are relevant for subsequent/later stages in life and (b) experienced developmental processes, (i.e. individual trajectories) remain consequential across the lifespan. This perspective roots in psychoanalytic approaches found in theories of Freud (1917, 1933) and Erikson (1968) who emphasize the role of childhood and adolescence for later life adaptation. According to Freud's psychoanalytic personality approach, childhood experiences and the developmental processes made during the early years of life are predictive of the adult personality. One of the main notions in Freud's personality theory is that human functioning develops along phases that represent within-psychic dynamics with interindividual different strategies to handle these dynamics. Even though Freud emphasized that childhood and adolescence remain consequential across the lifespan, his developmental theory is completed with the end of puberty (Flammer, 2009). Erikson took the Freudian psychoanalytic approach further by applying it to the whole lifespan (Erikson, 1968). In his view, eight stages of life span development can be identified, four of them (early childhood to school aged children) are virtually identical to the ones proposed by Freud. Each phase includes a 'psychosocial crisis' that is either successfully managed or unreached (e.g. infancy, trust vs. mistrust; early childhood autonomy vs. shame & doubt; preschool: initiative vs. guilt; school age: industry vs. inferiority; adolescence: identity vs. role confusion; early adulthood: intimacy vs. isolation; middle adulthood: generativity vs. stagnation; old age: ego integrity vs. despair). Successful resolving

is described as a backlog of positive compared to negative experiences relevant for each developmental stage and is conceptualized as a prerequisite for further adaptive development. Each individual is embedded in a social context that challenges and protects the individual as he/she moves through different developmental stages, thus, coping with the age-specific crises is expected to differ largely between individuals. A main focus of Erikson's publications lay on adolescence as a time of identity building during which individuals ideally find their role in the community, develop a sense of self and independence, and orientate themselves in own groups. Individuals who are insecure about their values, desires, and beliefs, on the other hand, develop confusion about themselves and about their future life (Erikson, 1968). Only if this 'crisis' is resolved can individuals become socially-integrated, autonomous and caring adults (Flammer, 2009).

The studies presented in this PhD thesis confirm the notion that adolescence is a key time period for adult life adjustment. More specifically, both self-related measures (self-esteem of academic competence, physical appearance and global self-worth) and other-related measures (empathy) can be regarded as resources that remain effectual over years and even decades. In line with Erikson's notion that adolescents ideally find their role in social groups, develop a sense of self and independence, and experience themselves as coherent and worthy individuals, the present thesis found these characteristics to be effectual not only for the adolescent him-/herself but also for one's further life as an adult (Studies 1 & 2). Remarkably, also the process of how adolescents "moved" through these challenging years showed effects that persisted across decades. That is, both the *level* of how individuals evaluate themselves in different domains as well as the *development* of this evaluation during this age period is relevant for later life. The most remarkable finding of Study 3 is that the experiences made in adolescence seem to be not only powerful within individuals but reveal consequences even for related individuals,

that is, for the next generation of adolescents: Adolescent depression was found to be related across generations over a time span of three decades. This finding might take the perspective of adolescence as a key time period for successful life adaptation further, insofar that it seems plausible to assume that adolescents who have not successfully coped with the challenges typical for this age-period, even transmit this negative developmental pattern to their adolescent children.

4.6 FUTURE DIRECTIONS

Although these findings confirm the commonly acknowledged notion that childhood and adolescent experiences can have a lasting impact on adult functioning, it would be interesting to take research a step further and investigate developmental trajectories even more in-depth.

One potential line of future research is to study atypical (adaptive or maladaptive) developmental trajectories, because the results presented here are restricted to the description of interindividual differences in certain characteristics (e.g. empathy) and to the observation of the *general* developmental trajectory as a predictor of adult life outcomes (e.g. a negative self-esteem trajectory predicts higher depressive affect in adulthood). The question arises what drove the pattern of those individual trajectories that are not represented in the general trend found. For example: What enables positive development in adulthood despite aversive early experiences (or vice versa what leads to negative outcomes despite positive early experiences). For instance, in Studies 1 and 2, the main findings were that (a) there are large *inter*individual differences in empathy and self-esteem development during adolescence, and (b) that a *general* positive trajectory in empathy and self-esteem remains consequential two decades later, above

and beyond initial self-esteem and empathy level. Among the 1,500 individuals, who decreased in one of these constructs but did not show any adverse effects in middle adulthood, and what moderated the turn-around? Which variables explain a decrease in empathy among adolescents and what served as a buffer later in life? Despite a negative trajectory in empathy or in self-esteem, for example, what characterizes individuals that are socially well adapted and low in depressive affect as adults? It would be interesting to study these individual trajectories to understand what exactly drives atypical developmental processes.

Another interesting line of investigation could be to study development in shorter time-intervals to examine the underlying developmental processes. For example, it could be educative to learn how malleable self-concepts are on a daily level and to see how increasing or decreasing patterns of self-perceptions influence other variables, i.e. depression. By looking at daily measurements of self-esteem, depression and other influencing variables (e.g. weather, stress level, work load, relationship variables, friendships, family circumstances, sports exercise, and physical measures) over a specific time (e.g. one month) we might be able to unfold specific patterns of influence that are not detectable with such broad measures as years. Study 4, that was dedicated to investigate the prospective influence of parenting on self-esteem, might reveal different results if there were daily measurements of family conflict, family discussions, problem solving with a parent, and self-esteem to see whether the (more or less positive) interaction with parents might lead to changes in how adolescents evaluate themselves over time. Furthermore, the findings of Study 4 call for a closer investigation of the differing roles of peers and parents. This is especially important because the social group orientation changes during this age period, in fact, this transformation might partly account for the missing prospective effects from parent closeness on self-esteem. By including peer relations together with parent relations and self-esteem, it might be possible to detect how different social groups

absorb and/or buffer conflicts. For example, it could be that positive parent-child relationships might protect a child who is bullied from developing a negative self-view. Or, conversely, a child that suffers from unusually strict authoritarian parents might draw strength from a strongly connected peer-group. It might also be possible to detect reinforcing pathways that replicate across the familial and peer group. Unfolding such patterns needs more intense, short-term longitudinal research that is able to draw quite specific models of human behaviour and development.

Tying in with this idea could also give rise to further development of Study 3. Instead of a nomothetic approach of studying transmission patterns that are assumed to be embedded in highly specific social circumstances, an idiographic approach for understanding the transmission of depression in parent-child pairs might be appropriate (Stern, 1911). To conceive similarities or differences between two generations, it might shed further light on the driving force of transmission if we study specific patterns of attributes typical for parent-child pairs that *do* transmit depression as opposed to parent-child pairs that *do not* transmit depression. Along this line of argumentation, four types of parent-child pairs might be identified. The first type could be a parent-child pair showing exceptionally high depression rates (i.e. more than two standard deviations above the mean) in both members of this pair, the second type a parent-child pair with exceptionally low depression rates, the third could be chosen on the basis of an extremely large difference between the parent (high depression) and the child (low depression) and the fourth type, in contrast to the latter, a child high in depression with a parent low in depression. Having chosen four pairs, their profiles might be described in detail along different parent and child variables and, in a second step, structural overarching principles based on within-pair associations might be identified (for an example of fictional transmission patterns, see Figure 6). Finally, their profiles (patterns of attributes might serve as ‘models’ for other

parent-child pairs of the correspondent type (Stern, 1911; for an overview of the nomothetic vs. idiographic approaches) and tested for validity.

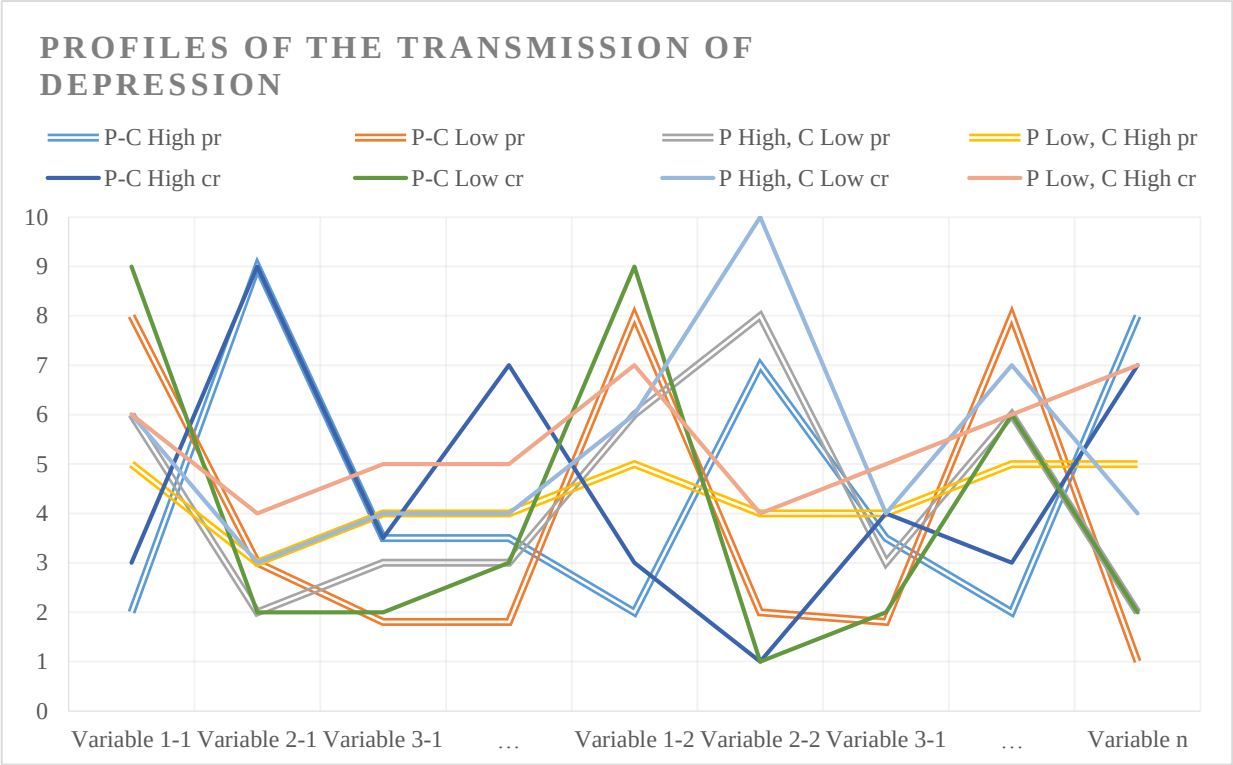


FIGURE 6

FICTIONAL EXAMPLE OF PARENT-CHILD DEPRESSION PROFILES

Note. P = Parent, C = Child, pr = parent reported, cr = child reported (adapted from Weber & Rammsayer, 2012; after Stern, 1911)

Finally, the findings of the presented studies together with the suggestions for further study in this field of research could build a ground for the development of individually designed

intervention programs aimed at correcting maladaptive adolescent trajectories in order to prevent and/or reduce long-term social and mental health risks.

Taken together, the present thesis confirms the importance of adolescence for successful life adaptation in adulthood, and even across generations. The findings presented here point out that both the perspective towards oneself (self-esteem) as well as towards others (empathy) in adolescence remains consequential still decades later. Furthermore, not only the starting conditions but also the developmental process during adolescence needs consideration in this respect. Paying special attention to developmental trajectories across the lifespan could inspire researcher to identify influential factors that shape development and, thus, contribute substantially to a deepened understanding of human functioning. Future research might build upon the findings presented here by unravelling even more complex patterns of development across the lifespan and across generations.

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Yang, Z., & Schaninger, C. M. (2010). The impact of parenting strategies on child smoking behavior: The role of child self-esteem trajectory. *Journal of Public Policy and Marketing, 29*, 232-247.

Yap, S. C. Y., Donnellan, M. B., et al. (in press). Investigating measurement invariance of the multi-group ethnic identity measure in a multiethnic sample of college students. *Journal of Counseling Psychology.*

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7 TABLES

8 FIGURES

Lebenslauf

Andrea E. Steiger
*23. 03. 1984

Ausbildung

09/2011 – 09/2014	Universität Zürich, Psychologisches Institut, Doktoratsstudium bei Prof. Dr. Mike Martin Thesis: Adolescent development of the self: Long-term risks and life outcomes
10/2005 – 03/2011	Universität Zürich, lic. phil. Studium der Psychologie, Sozial- und Wirtschaftsgeschichte & Biologie
04/2004 – 07/2008	Pädagogische Hochschule Zürich Eidg. dipl. Sekundarlehrperson
01/2000 – 12/2000	Austauschjahr in Australien mit American Field Services (AFS)
08/1998 – 08/2003	Kantonsschule Küsnacht Eidg. Maturität

Tätigkeiten

09/2013 – 12/2014	Forschungsprojekt *Selbst- und Persönlichkeitsentwicklung der Adoleszenz in langfristiger Perspektive*, Forschungsbeitrag Doc.CH des Schweizerischen Nationalfonds SNF
09/2011 – 08/2013	Wissenschaftliche Projektmitarbeiterin an der Universität Zürich, Projekt *LifE* (**L**ebensverläufe **i**ns **f**rühe **E**rwachsenenalter), Institut für Erziehungswissenschaft.
02/2012 – 12/2013	Dozentin für Jugendpsychologie an der Pädagogischen Hochschule Zentralschweiz, Luzern
10/2007 – 02/2012	Teilzeitanstellungen und Stellvertretungen als Sekundarlehrperson und IF-(Integrative Förderung) Lehrperson an der Volksschule des Kantons Zürich

02/2009 – 09/2010	Semesterassistentin am Lehrstuhl für Sozial- und Wirtschaftspsychologie von Prof. Dr. K. Jonas, Universität Zürich
02/2009 – 06/2009	Tutorin für Sozial- und Wirtschaftspsychologie, Frühlingssemester 2009, Universität Zürich

Persönliche Weiterbildung/Praktika

03/2014 – 08/2014	Forschungsaufenthalt an der Universität Potsdam, Deutschland Lehrstuhl für sozialwissenschaftliche Bildungsforschung, Prof. Dr. Wolfgang Lauterbach
11/2012	Forschungsaufenthalt (4 Wochen) an der University of California, Davis, USA Personality, Self and Emotion Regulation Laboratory, Prof. Dr. Richard Robins
07/2009 – 09/2009	Market Research, Transferplus AG, Stansstad
09/2006 – 10/2006	Assistant Teachership an der Richmond Hill High School, Ontario, Kanada
12/2003 – 03/2004	Vertriebscontrolling, Genfer Versicherungen, Genf

Weitere Tätigkeiten

10/2011 - 03/2014	Delegierte in der Nachwuchsförderungskommission des Vereins akademischer Mittelbau der Universität Zürich, VAUZ

Grants

07/2013	Doc.CH -Forschungsbeitrag für eigenes Projekt *Selbst- und Persönlichkeitsentwicklung der Adoleszenz in langfristiger Perspektive,* (CHF 105´800)
11/2013	Mobilitätsbeitrag für 6 Monate Forschungsaufenthalt an der Universität Potsdam, Deutschland, (CHF 9´700)

Sprachen

Deutsch	Muttersprache
Englisch	sehr gute Kenntnisse, Certificate of Proficiency in English
Französisch	gute Kenntnisse, viermonatiger Arbeitsaufenthalt in Genf
Italienisch	Basiskenntnisse

Publikationen

Under review:

Harris, M. A., **Steiger, A. E.,** Ferrer, E., Donnellan, B. M., Allemand, M., Fend, H. A., Conger, R. D., & Trzesniewski, K. H. (under review). Do parents foster self-esteem? Testing the prospective impact of parent closeness on adolescent self-esteem.

Steiger, A. E., Fend, H. A., & Allemand, M. (under review). Testing the vulnerability and scar models of self-esteem and depression from adolescence to adulthood and across generations.

Published/in press:

Allemand, M., **Steiger, A. E.**, & Fend, H. A. (in press). Empathy development in adolescence predicts social outcomes in adulthood. *Journal of Personality.*

Steiger, A. E., Allemand, M., Robins, R. W., & Fend, H. A. (2014). Low and decreasing self-esteem during adolescence predict adult depression two decades later. *Journal of Personality and Social Psychology, 106*, 325–338.

Erzinger, A., & **Steiger, A. E.** (2014). Intergenerational transmission of parenting beliefs. The moderating role of interaction quality. *European Journal of Developmental Psychology, 11*, 177-195.

Allemand, M., **Steiger, A. E**., & Hill, P. L. (2013). Stability of personality traits in adulthood: Mechanisms and implications. *Journal of Gerontopsychology and Geriatric Psychiatry, 23*, 5-13.

Präsentationen

Steiger, A. E. & Allemand, M. (2014, July). *The impact of change in self-esteem on depression from adolescence to middle adulthood.* Paper presented at the 17th European Conference on Personality, Lausanne, CH.

Steiger, A. E. (2014, May). *Longitudinal associations of self-esteem and depression across generations.* Poster presented at the 26th Annual Convention for Psychological Science, San Francisco, USA.

Steiger, A. E. & Maag Merki, K. (2013, November). *Level and change in adolescent achievement motivation as predictors of job motivation in adulthood*. Paper presented at the 2nd International Conference on Transitions in Youth and Young Adulthood, Basel, CH.

Steiger, A. E., & Allemand, M. (2013, September). *The effect of self-esteem development on life outcomes: What does self-esteem change explain above and beyond level of self-esteem?* Paper presented at the 13th Biannual Congress of the Swiss Psychological Society, Basel, CH.

Steiger, A. E., & Harris, M. (2013, September). *Understanding the link between parenting and self-esteem in adolescence*. Paper presented at the 14th European Conference on Developmental Psychology, Lausanne, CH.

Steiger, A. E., & Allemand, M. (2013, March). *Empathy level and development in adolescence as predictors for high satisfaction in adult romantic relationships.* Paper presented at the 1st World Conference on Personality, Stellenbosch, SA.

Steiger, A. E. (2012, July). *Development of self-esteem and self-concepts during adolescence: Do they predict mental health in adulthood?* Poster presented at the 16th European Conference on Personality, Trieste, ITA.

Steiger, A. E., & Derungs, K. (2010, May). *The influence of emotions and protected values on reactions in the ultimatum game.* Poster presented at the LiDoKo (Lizentianden-Doktoranden-Kongress), University of Zurich, CH.

Invited talks:

Steiger, A. E. (2013, November). Adoleszenz – Wird hier der Grundstein für eine erfolgreiche Lebensbewältigung gelegt? [Adolescence – is it a key period for later successful life management?] Talk held at the University of Applied Sciences, Teachers College, Lucerne, CH.